THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC

ABSTRACT BOOKLET

GWSPH
Research Day

May 9, 2023

GW | Public Health
The George Washington University
Milken Institute School of Public Health
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Message from the Dean

Dear GWSPH Community,

Welcome to the Milken Institute School of Public Health 26th Annual Research Day!

Research Day is one of my favorite events of the year, as it serves as both a celebration of the work of our students showcasing their achievements and it recognizes the mentorship and encouragement that inspires these students to be their best. This showcase event exemplifies GWSPH's commitment to students of all disciplines to provide the opportunity to engage in creative endeavors, focused inquiry, and deep discovery in their passion.

Supporting our students' applied learning experiences is central to the mission of the Milken Institute School of Public Health Research, in particular, helps students develop creative thinking and scientific reasoning skills, the ability to analyze information, and the experience of creating a scientific presentation. Participation in research day is a great opportunity to learn how to communicate effectively, share stories, and have the opportunity to connect with people from diverse cultures, disciplines, and ideologies. Our students will take these skills forward as they become future public health leaders. This path of discovery is an integral part of our students' journeys to enhance their learning and develop meaningful relationships with faculty, professional experts, and their peers.

Please accept my heartfelt thank you to all of our students who have participated, your work is awe-inspiring, and to each of you who work with these outstanding students and help them reach their goals – my deepest gratitude.

I welcome you and encourage you to view the outstanding work of our presenters and take the opportunity to interact with our remarkable students.

Sincerely,

Lynn R. Goldman, MD, MS, MPH
Michael and Lori Milken Dean of Public Health
The George Washington University

Message from Senior Associate Dean for Research

Dear Guests and members of the GW community,

It is my pleasure to welcome you to the GW Milken Institute School of Public Health's Research Day 2023. Today, we gather to celebrate the innovative and impactful research that has been conducted by our esteemed faculty, staff, and students over the past year.

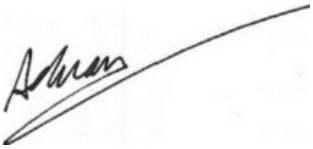
As we all know, public health has become more important than ever before in our rapidly changing world. Through their dedicated work and groundbreaking research, the Milken Institute School of Public Health has become a leader in the field, driving forward new discoveries and advancements that will help us create a healthier, more equitable future for all.

Today's event offers us the opportunity to learn about the latest breakthroughs, engage in lively discussions, and forge new connections and collaborations. On display is research in a variety of areas, from immunization to exercise and nutritional sciences to health policy and management.

I would like to extend my deepest appreciation to all of our presenters, organizers, and attendees for their dedication to the pursuit of knowledge and the betterment of public health. I am confident that today's event will inspire us all to continue pushing the boundaries of what is possible and to work tirelessly towards creating a healthier, more just world for all.

And my thanks to all the staff and volunteers who made this Milken Institute School of Public Health Research Day 2023 possible!

Sincerely,



Adnan A. Hyder, MD, MPH, PhD
Senior Associate Dean for Research
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Program

GWSPH Research Day
May 9, 2023
The Convening Center
Milken Institute School of Public Health

9:00 am - 11:00 am	Poster Presentation Setup
12:00 pm - 2:00 pm	Judging of Posters
2:00 pm - 2:30 pm	Coffee & Cookies Break
2:30 pm - 3:00 pm	Awards & Prizes Ceremony
3:00 pm - 3:30 pm	Poster Removal

ABSTRACTS

Biostatistics and Bioinformatics

GWSPH RESEARCH SHOWCASE

BIOSTATISTICS AND BIOINFORMATICS

deepBreaks: a machine learning tool for identifying and prioritizing genotype-phenotype associations

Background: Genomics data has proven to be an essential tool for understanding diseases and developing interventions. However, there are many challenges with this data, including non-independent observations, large noise components, nonlinearity, collinearity, and high dimensionality. Machine learning (ML) techniques have been shown to be well-suited for addressing these challenges and capturing non-structural patterns. In recent years, large datasets have allowed researchers to implement ML to study sequence-to-phenotype associations and develop models with high-performance metrics. However, the interpretability of these models is crucial for translational researchers seeking to benefit from ML in precision medicine. This study proposes an ML-based tool that is generic, interpretable, and user-friendly to help characterize the dynamics of mutations in viruses and host genes on a population scale.

Methods: We developed a python package called *deepBreaks*, which consists of three phases: preprocessing, modeling, and interpreting. In the preprocessing step, *deepBreaks* recodes the sequencing data and phenotype automatically and takes care of missing values, zero-entropy columns, correlated positions, and redundant features. The modeling step involves various ML models, which are ranked based on their cross-validation scores. The interpretation step reveals the positions that best predict the phenotype. We applied this method to four biological domains, including the analysis of 175 sequences of rod opsins, 35,424 sequences of HIV-1 gp120, 1005 sequences of Haemophilus parainfluenzae, and 19,481 sequences of the spike protein of SARS-CoV-2 Alpha and Omicron variants.

Results: The results demonstrated the efficacy of the developed method through its successful application in four distinct biological domains. The analysis of rod opsins prioritized the positions with significant mutations and introduced new positions for further experiments. The modeling of HIV-1 identified the positions with mutations that are potentially important for viral function. The analysis of Haemophilus parainfluenzae identified an ordered list of positions that contributed to the models predicting the niches of each sample. The study also identified the regions associated with SARS-CoV-2 Alpha and Omicron variants and reported the most discriminative positions between the two variants, including mutations with substitutions, insertions, and deletions.

Conclusion: This study developed a generic, interpretable, and user-friendly ML-based tool called *deepBreaks* that characterizes the dynamics of mutations in viruses and host genes on a population scale. The results demonstrated the versatility and utility of this tool in various biological applications. This approach holds great promise for advancing the field of genomics and its applications in precision medicine, gene modification, rare disease, antimicrobial resistance research, and beyond.

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GWSPH RESEARCH SHOWCASE

BIOSTATISTICS AND BIOINFORMATICS

Benefit–risk assessments during a clinical trial using Desirability of Outcome Ranking (DOOR) methodology: A prediction approach

Protecting the welfare of participants in clinical trials through the monitoring of trial results is an ethical imperative. Data monitoring committees (DMCs) protect clinical trial participants by conducting benefit:risk assessments during the course of a clinical trial. These evaluations may be improved by using an outcome that more comprehensively conveys the joint benefit and risk effects as experienced by the trial participants. Thoughtful integration and presentation of the joint outcome may provide structure to these evaluations and will help facilitate DMC benefit:risk assessments.

The Antibacterial Resistance Leadership Group (ARLG) has developed the Desirability of Outcome Ranking (DOOR) methodology, a novel paradigm for design, conduct, analysis, and interpretation of clinical trials. The DOOR methodology allows medical researchers and clinicians to more effectively evaluate treatment strategies through comparison of the patient-centric risks and benefits of intervention alternatives. When using the DOOR methodology, an important first step is to define an ordinal DOOR outcome representing a global patient response considering benefits and harms. The DOOR probability (i.e., the probability of a more desirable result [adjusted for tied desirability]) in one treatment relative to another treatment is estimated using pairwise comparisons. Recently the two ARLG clinical trials, “A Phase 2b, Multicenter, Randomized, Open-Label, Assessor-Blinded Superiority Study to Compare the Efficacy and Safety of Dalbavancin to Standard of Care Antibiotic Therapy for the Completion of Treatment of Patients with Complicated S. aureus Bacteremia” (DOTS, NCT04775953) and “A Phase 1b/2 Trial of the Safety and Microbiological Activity of Bacteriophage Therapy in Cystic Fibrosis Subjects Colonized With Pseudomonas Aeruginosa” (PHAGE, NCT05453578) have been designed and implemented, using the DOOR methodology.

We discuss the prediction method during interim monitoring of a clinical trial, to assess benefit:risk using the DOOR, to inform DSMB decision-making. The prediction method utilizes simulation of the yet-to-be-observed outcomes in the trial, based on reasonable assumptions. The prediction method provides a flexible, practical, and appealing tool for conducting benefit:risk assessments during a trial, providing for quantitative evaluation of the potential between-treatment contrast in benefit:risk and associated uncertainty, with the trial continuation. We describe visualization tools summarizing prediction results. We compare this strategy for interim data monitoring with alternative methods based on the conditional and predictive powers. We describe and illustrate the methods being applied to the ongoing DOTS and PHAGE clinical trials. We provide guidance for monitoring benefit:risk using the DOOR with the prediction method. Finally, we summarize the findings and discuss extensions.

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GWSPH RESEARCH SHOWCASE

BIOSTATISTICS AND BIOINFORMATICS

massSight: Metabolomics meta-analysis through multi-study data scaling, integration, and harmonization

Understanding underlying biological processes is essential for providing effective treatment for diseases. Investigating complex biological behavior at the cellular and molecular levels requires profiling different aspects of human biology, such as small molecules and metabolites. Liquid chromatography-mass spectrometry (LC-MS) based methods are ideal tools for characterizing and investigating human health by profiling metabolites. LC-MS-based metabolomics methods can yield data on thousands of features, each characterized by its descriptors: a measured mass-to-charge ratio (m/z), chromatographic retention time (RT), and signal intensity (SI). LC-MS techniques are powerful, but quite sensitive and complex. Furthermore, this complexity increases when working with metabolites among different studies or LC-MS platforms. We present **massSight**, a computational tool to inspect and adjust drift, scale raw metabolite intensities, align annotated and unannotated peaks between separately acquired data sets, and remove redundancies in nontargeted LC-MS data arising from multiple ionization products of a single metabolite. The platform will come with a set of novel tools, complementary to LC-MS metabolite profiling techniques to accurately profile features, align features across studies and platforms, perform scaling, and consolidate adducts and fragments of chemical compounds.

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GWSPH RESEARCH SHOWCASE

BIOSTATISTICS AND BIOINFORMATICS

The DOOR is open: A Web-based Application for Desirability of Outcome Ranking Analyses

The Antibacterial Resistance Leadership Group (ARLG) has developed the Desirability of Outcome Ranking (DOOR) methodology, a novel paradigm for design, conduct, analysis, and interpretation of clinical trials. The DOOR methodology allows doctors to evaluate and select treatment strategies by giving them a more informative way to compare the patient-centric risks and benefits of intervention alternatives more effectively. The methodology has been implemented in the design and analysis of many clinical trials in infectious diseases and other areas.

When using the DOOR methodology, an important first step is to define an ordinal DOOR outcome representing a global patient response considering benefits and harms. There are two complementary approaches to DOOR analyses. The first approach uses the concept of pairwise comparisons of the DOOR responses between treatments. The DOOR probability (i.e., the probability of a more desirable result [adjusted for tied desirability]) in one treatment relative to another treatment is estimated using these pairwise comparisons. The second approach, "partial credit" analyses involve grading the levels of the DOOR on a scale from 0 to 100 that allows strategic scoring, permits preferential assignment of relative importance to the DOOR levels for personalized analysis, and allows for evaluation of robustness through analysis of varying grading keys.

The Statistical and Data Management Center (SDMC) of the ARLG is developing a series of interactive web-based applications (apps) with downloadable data presentations, to help clinical researchers conduct DOOR analyses. The apps were built using R package "Shiny".

The application for DOOR analyses requires summary level data inputs of a summary table of DOOR outcome distributions by 2 intervention groups. The app generates several ARLG recommended components of comprehensive DOOR analyses, including DOOR distribution summary tables and figures, forest plot displays of the estimates of the DOOR probabilities for the DOOR and respective components, and partial credit analysis.

The app provides comprehensive tools for clinical researchers to implement DOOR methodology for their studies. The SDMC is developing additional augmentations to design and monitor clinical trials using DOOR. The application is freely available online at https://methods.bsc.gwu.edu/web/methods/door-standard-edition.

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GWSPH RESEARCH SHOWCASE

BIOINFORMATICS AND BIOSTATISTICS

Machine Learning Informs Clinical Utility of Transcriptomic Endotypes in Systemic Lupus Erythematosus (SLE)

Clinical and molecular heterogeneity of systemic lupus erythematosus (SLE) has challenged clinical care and developments in precision medicine, including patient selection for clinical trials. We previously identified endotypes, i.e., subsets of patients defined by distinct pathobiological functions, biomarkers, or other disease mechanisms, by use of transcriptomic signatures of immune cell/inflammatory and functional pathways and k-means clustering.

Our goal was to evaluate the clinical relevance of these determined endotypes by constructing and evaluating models predictive of responsiveness to a lupus biologic, tabalumab.

We analyzed a publicly available clinical trial dataset containing gene expression data and extensive patient metadata at baseline (GSE88884 on Gene Expression Omnibus). A series of binary classifiers were constructed in R v. 4.2.1 using three versions of features: 1) endotype membership and gene expression enrichment scores of immune and inflammatory gene modules, 2) standard laboratory measures, and a combination of 1) and 2). Performance metrics from these three sets of models, including accuracy, area under receiver-operator characteristic curves, and Cohen's kappa were compared and multiple algorithms including logistic regression, support vector machine, and gradient boosted classification trees, were used. The outcome variable of interest was whether a subject improved their SLE disease activity score by at least 4 points by the end of the trial (52 weeks).

Preliminary findings indicated that a combination of genomic features and standard clinical features were more predictive of responsiveness to tabalumab than genomic features alone, but no more predictive than clinical features alone. Machine learning models with combinations of genomic and clinical features performed better than models with genomic features alone and similarly to models with clinical features alone.

These data indicate that the transcriptomic endotypes do not provide additional clinical utility over standard laboratory measures. There may be other factors confounding the outcome variable, response to the biologic tabalumab, such as clinical trial biases.

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GWSPH RESEARCH SHOWCASE

BIOINFORMATICS AND BIOSTATISTICS

Metabolic and Microbial Changes Caused by Sleeve Gastrectomy and Roux-en-Y Gastric Bypass in Adolescents

Clinical obesity remains one of the most persistent medical challenges both at home and abroad, with the prevalence of childhood and adolescent obesity at almost 1 in every 5 individuals in the United States. In this study, we follow a set of participants who underwent either a novel sleeve gastrectomy procedure or a Roux-en-Y gastric bypass capable of assisting with weight loss to study how the procedure, along with a participant's physical characteristics like insulin resistance, bone density, and other clinical parameters, can lead to changes in their metabolome, changes in the taxonomic composition of their microbiome, and changes in their health outcomes. With clinical data from patients and controls, metagenomic data from stool samples, and metabolomic data from blood samples, we utilized multiple computational tools (namely omeClust, Maaslin2, Tweedieverse, and selected regression techniques in R) to perform unsupervised clustering and association testing, which validated specific relationships between participant features and metabolomic data that warrant further investigation. Certain taxa and metabolites were observed to be elevated in participants who underwent the surgery relative to those who did not. A more complete understanding of the clinical, metagenomic, and metabolomic impact of such medical procedures would increase the sustainability of these interventions and improve patient survival and other health outcomes.

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GWSPH RESEARCH SHOWCASE

BIOSTATISTICS AND BIOINFORMATICS

Longitudinal Benefit:Risk Analysis through Desirability of Outcome Ranking(DOOR) in Clinical Trials

Background: Benefit:Risk evaluation can be misleading if we evaluate efficacy and safety separately. Such analyses fail to incorporate associations between outcomes, ignore the cumulative nature of outcomes in individual patients, and suffer from competing risk complexities during interpretation of individual outcomes. Since efficacy and safety analyses are often conducted on different populations, generalizability is unclear.

Methods: The desirability of outcome ranking (DOOR) is a new paradigm for clinical trials that addresses this issue. A patient's overall outcome is ranked based on pre-specified clinical criteria, where the most desirable rank represents a good outcome with no side effects and the least desirable is death. The Mann-Whitney-U statistic accommodating ties is often used to compare the DOOR outcomes between two treatment arms. We extend existing methods to estimate and make inferences on the longitudinal treatment effects. We establish the large sample properties of the nonparametric estimators of the temporal treatment effects and construct the simultaneous confidence bands accounting for the correlations of the estimators across different time points. We propose a weighted Mann-Whitney-U statistic, where the weight as a function of time is chosen based on its clinical importance.

Results: An application to a Covid-19 trial (ACTT-1) that compares safety and efficacy between Remdesivir and Placebo is conducted. 1062 patients were followed up at 8 visits within 30 days, and their clinical status were recorded. Marginal analyses on death or adverse events would suggest similarity between the two treatment arms but DOOR analyses offer further insight. Simultaneous confidence intervals on the DOOR probability as well as a weighted average of DOOR over time can be used as tools to determine if Remdesivir outperforms Placebo in terms of patient trajectory. Simulation studies demonstrate that the proposed methods function well in practical settings.

Conclusion: Conventional methods in clinical trials use patients to analyze outcomes, but we propose using outcomes to analyze patients. Our longitudinal DOOR approach not only gives estimates of treatment effects at each time point, but also provides an overall estimate that can be tested easily, and thus can further assist clinical researchers in evaluating longitudinal treatment effects.

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GWSPH RESEARCH SHOWCASE

BIOSTATISTICS AND BIOINFORMATICS

Benefit-risk Evaluation for Diagnostics: A Framework (BED-FRAME) and Average Weighted Accuracy (AWA): Online analysis tool

Background
Traditional evaluation of diagnostics mainly includes estimation of sensitivity, specificity, positive/negative predictive values (PPV/NPV), and likelihood ratios. Although useful, these measures are insufficient for guiding medical decision-making regarding diagnostic alternatives. As such, the Benefit-risk Evaluation for Diagnostics: A Framework (BED-FRAME) was proposed to systematically and pragmatically evaluate and compare diagnostics. To implement such methods in different study and clinical scenarios, a software enabling user interaction is needed.

Objectives
To develop and illustrate a freely-available online app to provide pragmatic evaluation and comparison between diagnostic alternatives using BED-FRAME and Average weighted accuracy (AWA).

Methods
BED-FRAME is designed to evaluate and compare diagnostic alternatives based on diagnostic yield, i.e., the distribution of true positive (TP), true negative (TN), FP, and FN results. BED-FRAME considers: (1) disease prevalence, and (2) the relative importance of potential errors (FP vs. FN) to provide a pragmatic evaluation and comparison of diagnostic alternatives. Weighted accuracy (WA), ranging from 0 to 1, represents accuracy adjusted for prevalence and the relative importance. AWA is the average WA over a relevant range of prevalence. Best random test (BRT), the random test with the largest AWA, is induced as a minimal standard to evaluate a new diagnostic test, where a random test has a fixed probability of positivity.
A statistical analyses plan (SAP) for BED-FRAME/AWA was developed consisting of outputting (1) the estimated sensitivity, specificity, and PPV/NPV in a forest plot; (2) a plot of the expected diagnostic yield as prevalence varies for each diagnostic; (3) a plot of the expected between-diagnostic difference in FN and TN as prevalence varies; (4) the number needed to test to observe a between-diagnostic difference in resulting diagnoses; (5) a plot of the WA as relative importance changes for each diagnostic; (6) a contour plot of the between-diagnostic difference in WA under various combination of prevalence and relative importance; (7) point and confidence interval estimates of (i) AWA (ii) between-test AWA differences as the relative importance varies; and (8) a plot of the AWA of random tests with fixed probabilities from 0 to 1.

Results
A freely-available online R Shiny App was developed to implement the recommended SAP. Application of the online tool was illustrated using an example from the Antibacterial Resistance Leadership Group (ARLG).

Conclusions
BED-FRAME and AWA provide pragmatic evaluation and comparison of diagnostics alternatives. The BED-FRAME/AWA shiny app provides a simple freely available online tool to implement BED-FRAME/AWA analyses.

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GWSPH RESEARCH SHOWCASE

ENVIRONMENTAL AND OCCUPATIONAL HEALTH

Nitrate ingestion from drinking water and ovarian cancer risk in the agricultural health study

Background: Ovarian cancer is the fifth most common cancer diagnosed among women in the United States. N-nitroso compounds (NOCs) formed endogenously after nitrate/nitrite ingestion has been shown to cause ovarian cancer in animals. Few epidemiologic studies have evaluated the association of drinking water nitrate with ovarian cancer risk, and the only previous investigation observed increased risks with higher intake.

Methods: We evaluated nitrate exposure from drinking water and ovarian cancer risk in the Agricultural Health Study, a cohort of pesticide applicators and their spouses in Iowa and North Carolina. For the enrollment water source (1993-1997; N=29,408), we computed average nitrate concentrations for women on public water supplies (20% of participants) from historical monitoring data and estimated nitrate concentrations in private wells (76%) using random forest models; 4% used other water sources and were excluded.

We used Cox regression models adjusted for age, state, body mass index, smoking status, and menopausal status to estimate hazard ratios (HR) and 95% confidence intervals (CI) for nitrate quartiles (with an additional 90th percentile split). To evaluate effect modification, among those with dietary data (collected at first follow-up; N=13,137), we stratified continuous drinking water nitrate intake (per 10 mg/day) above and below the median intake for energy adjusted Vitamin C (99.5 mg/day), as higher Vitamin C intake decreases endogenous NOC formation.

Results: We identified 122 ovarian cancer cases through 2018 (Iowa) and 2014 (North Carolina). Risk was elevated (HR=1.19, CI:0.62–2.26, $_{P\text{-trend}}$=0.42) for women in the 90th percentile (≥7.43 mg/L NO_3-N) versus the lowest quartile (≤0.82 mg/L). We also found that Vitamin C intake below the median was associated with an elevated risk of ovarian cancer (HR: 1.71, 95%CI: 0.59 – 4.90).

Conclusions: Although we cannot rule out the possibility our findings are due to chance**,** they suggest that higher average nitrate levels in drinking water may increase ovarian cancer risk and that Vitamin C intake may modify this relationship. More research is needed that includes more women from more geographic areas as well as more ovarian cancer cases to increase the power of the study.

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GWSPH RESEARCH SHOWCASE

ENVIRONMENTAL AND OCCUPATIONAL HEALTH

GRAPE: A Fungal Study

Aspergillus is an environmental fungus that can cause infections and, in some instances, severe diseases and death. While there are currently antimicrobials that can target these infections, resistance is becoming an increasing threat to the efficacy of these drugs. While there is the possibility of new drug research, antifungals are hard to develop due to the shared cellular functions and components of the fungus cells and human cells. To have a better understanding of Aspergillus resistance, first there must be an understanding of how this resistance is acquired. We hypothesize that resistance to medical antifungal triazole drugs is promoted using environmental and agricultural azoles. Soil samples were collected from areas around vineyards in southern California. From these samples, Aspergillus colonies were isolated and screened for resistance to three medically important triazole drugs; Itraconazole, Voriconazole, and Posaconazole. The samples will also be analyzed through microbiomics and MS to determine the concentration of azoles of interest in the soil. If a connection between agricultural antifungal use and resistance to medically important triazoles is established, this finding could have major implications for using environmental antifungals and the future of antimicrobial resistance research and policy.

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GWSPH RESEARCH SHOWCASE

ENVIRONMENTAL AND OCCUPATIONAL HEALTH

Assessing the Impact of Urban Definition on Estimates of Urban Air Pollution: Global Estimation of $PM_{2.5}$ and NO_2

Air pollution has become one of the most significant health determinants. In 2019, 4.5 million premature deaths were attributable to outdoor air pollution. Given that more than half of the global population resides in urban areas, accurate estimation of urban air pollution is of utmost importance. This study aimed to estimate annual $PM_{2.5}$ and NO_2 concentrations in 13,000 cities worldwide using the latest high resolution (1 km^2) satellite-based global estimates of air pollution at grid-level. This study also examined how insights regarding urban air pollution vary depending on urban definition, using two different urban definitions; the Global Human Settlement-Settlement Model (GHS-SMOD) and the C40 cities urban definitions. We found that $PM_{2.5}$ concentrations had increased in urban areas since 2010 and slightly decreased thereafter, with an average concentration of 38.2 mg/m^3 in 2021, which was more than seven times the current World Health Organization (WHO) $PM_{2.5}$ standard (5 mg/m^3). The highest $PM_{2.5}$ concentrations were found in cities in South Asia, the Middle East, and certain regions in sub-Saharan Africa. For NO_2, the results show a constant trend since 2005 with an average concentration of 12.6 mg/m^3 in 2020, which was slightly higher than the WHO NO_2 standard (10 mg/m^3). The highest NO_2 concentrations were found in cities in East Asia, Europe, and North America in 2020. This study found that different urban definitions resulted in different estimates of city-averaged pollutant concentrations, especially for NO_2 (discrepancies up to 10.4 mg/m^3 for $PM_{2.5}$ and 21.8 mg/m^3 for NO_2 in 2020). Also, the number of urban areas exceeding the WHO NO_2 standard in 2020 differed depending on definitions (C40: 82/86 vs. GHS-SMOD: 86/86). Based on the WHO standard, the number of people living with unhealthy levels of urban NO_2 varied from 500,000,000 with the C40 definition to 720,000,000 with the GHS-SMOD definition. For $PM_{2.5}$, both urban definitions indicated all cities exceeded the WHO standard in 2020. This study provides the global distributions and temporal trends of urban $PM_{2.5}$ and NO_2 with improved accuracy by utilizing the latest global estimates for each pollutant. In addition, this study found distinct urban definitions may result in different conclusions regarding urban air quality, suggesting the need for researchers to carefully consider urban definitions.

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GWSPH RESEARCH SHOWCASE

ENVIRONMENTAL AND OCCUPATIONAL HEALTH

Assessing the Impact of COVID-19 Shutdown on Traffic-related Air Pollution in Seoul, Korea: A Case Study Using Random Forest

The COVID-19 pandemic had a significant impact on our health in many ways by altering health behaviors and lifestyles. Interestingly, the strict national-level COVID-19 measures implemented worldwide offers an opportunity for a natural experiment in environmental research. As the primary objective of these measures was to restrict people's mobility, they had a substantial effect on air pollutants emitted from mobile sources. Therefore, this study aims to evaluate the impact of COVID-19 shutdown measures on traffic-related air pollution (PM_{10}, NO_2, and $PM_{2.5}$) in Seoul, Korea, using random forest (RF) and multivariate linear regression (MLR) prediction models. To assess changes in air quality due to COVID-19 shutdown measures, we compared the time series trends of observed air quality and business-as-usual (BAU) air quality. Pre-shutdown period was defined as January 2010 – February 2020 and shutdown period as March 2020 – October 2021. The impacts of COVID-19 shutdown on air quality were measured using the differences-in-differences approach (e.g., $PM_{2.5,\ observed}$ - $PM_{2.5,\ BAU}$ during pre-shutdown vs $PM_{2.5,\ observed}$ - $PM_{2.5,\ BAU}$ during shutdown period). The BAU air quality was predicted using RF and MLR, and the best models were selected based on model performance. The prediction models incorporated daily average PM_{10}, NO_2, and $PM_{2.5}$ concentrations as outcome variables and meteorological factors (daily temperature, relative humidity, surface pressure, precipitation, surface wind speed, and wind direction) and trend terms (Unix date, Julian date/seasonal dummy variable, and day of week) as predictor variables. Trend terms were included to account for background air pollutant emission trends. The prediction model was trained on data for the pre-shutdown period. Compared to MLR models, the RF models showed better R^2 values for every pollutant; hence, the final prediction of BAU air quality was conducted using RF models. We found that the COVID-19 shutdown measures in Seoul led to a significant reduction in traffic-related air pollution, with NO_2 and $PM_{2.5}$ experiencing the greater decreases. For example, observed NO2 was on average 1.4% lower than BAU during pre-shutdown period, whereas it was 17.2% lower during shutdown period (PM_{10}: -3.3 vs. -16.0%, $PM_{2.5}$: -5.5 vs. -48.4%). This study found that the COVID-19 shutdown measures in Seoul were effective in reducing traffic-related air pollution, with the largest impact observed for NO_2 and $PM_{2.5}$.

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GWSPH RESEARCH SHOWCASE

ENVIRONMENTAL AND OCCUPATIONAL HEALTH

GW COVID-19 National Health Worker Survey: First Results

Background: This report summarizes results of a national COVID-19 health care worker (HCW) anonymous online survey conducted by students and staff with support from faculty mentors of the Department of Environmental and Occupational Health at The George Washington University Milken Institute School of Public Health. The survey was launched in May 2020 to capture the COVID-19 related workplace experiences of a group of HCWs, frontline US workers who have worked since the onset of the pandemic to provide care for millions of Americans. This report discusses survey responses of 1,200 HCWs collected during May and June 2020. The objective of this survey was to give voice to the experiences of these workers who are caring for and healing millions of people under extraordinary circumstances.

Methods: The survey was developed using REDCap (Research Electronic Data Capture), a secure web-based application for online surveys and databases. It was then tested among volunteers from health care worker organizations before it was finalized and made public. The final survey collected data on demographic characteristics such as age, gender, race/ethnicity, and occupation, as well as work site location(s), health care facilities, personal protective equipment (PPE) received, employer-imposed conditions and restriction to PPE use, and worker exposure to COVID-19 patients. In addition, the survey included the option for HCWs to assess their working conditions and safety-related concerns through open-ended questions and comments.

Results: The responses to this survey, provided by volunteer anonymous HCWs from around the nation, are not representative of all HCWs. However, we believe that they contain important insights into the conditions facing HCWs on the frontlines of this pandemic and remind us that much about the experience of these HCWs cannot be characterized by statistics alone — there are voices and experiences of real people behind every statistic. These workers described a variety of experiences, some positive and some not. Some reported employers who helped protect them from COVID-19 infection; other respondents shared excruciating experiences, ranging from retaliation from employers to being treated as disposable.

Conclusion: Health care workers are a critical segment of the workforce on the frontlines who continue to provide services for this nation during the ongoing pandemic. It is imperative to listen to the voices of HCWs, engage in measures that reduce the spread of COVID-19, and enforce scientifically sound occupational health policies.

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GWSPH RESEARCH SHOWCASE

ENVIRONMENTAL AND OCCUPATIONAL HEALTH

Commensal Probiotics: Inhibition of Colonizing *S. aureus* by Nasal Commensal *D. pigrum*, Isolation and in-vitro Characterization of Clinical Isolates

Background/Significance: *S. aureus* is a major contributor to nosocomial infections and deaths globally; additionally, it's estimated that up to 1/3 of the population is continuously colonized with this (potentially) pathogenic bacteria. Colonization with *S. aureus* (and other opportunistic nasal pathogens) increases one's risk of developing severe infections. The nasal commensal bacteria *Dolosigranulum pigrum* is negatively associated with *S. aureus* colonization, we have shown it can readily inhibit pathogen growth in-vitro and therefore may offer a unique alternative to antibiotics that already exists in the population.

Purpose: Isolate and characterize a diverse repertoire of *D. pigrum* strains from clinical samples of the nasal microbiome for experimental use. Quantify the antagonistic ability of *D. pigrum* isolates against S. aureus and a panel of other clinically significant pathogens. Describe the inhibition profiles (phenotypes) of *D. pigrum* isolates in relation to their individual growth dynamics.

Methods: A standardized plate-based antagonism assay was used to visualize pathogen inhibition of 40 *D. pigrum* isolates. Isolates were tested against the methicillin-resistant *S. aureus* strain ATCC strain USA300 to look for growth inhibition after 24hrs. Antagonism (zone of inhibition) was quantified using MATLAB image analysis adapted from the techniques of the ADAGIO AST platform. Each isolate's growth dynamics in liquid media were analyzed using 24-hr growth curve data obtained via OD (optical-density) reading. Growth curve readings were used to determine mean doubling time and generation time of each isolate.

Findings/Conclusions: All isolated *D. pigrum* strains antagonize *S. aureus* growth in-vitro. Average antagonism (zone of inhibition) ranged from ~1.9-9.2mm per isolate, indicating that some isolates are better at inhibiting pathogen growth compared to others. This difference does not appear to be directly related to the growth speed/dynamics of individual *D. pigrum* isolates in culture. Differences in the observable antagonism phenotypes of *D. pigrum* may therefore be due to inter-isolate genetic variability affecting the timing and release of inhibitory/effector molecules (i.e., quorum sensing pathways, bacteriocins). This bacterium is a prime target for probiotic development, which could allow for the de-colonization of nasal pathogens in patients, lowering their risk for contracting severe respiratory infections.

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GWSPH RESEARCH SHOWCASE

ENVIRONMENTAL AND OCCUPATIONAL HEALTH

The Effect of Heat Exposure on Kidney Function in Agricultural Workers: A Systematic Review

Background: Agricultural workers in Central America and Southern North America develop chronic kidney disease of unknown etiology (CKDu) at higher rates than the general population. This endemic CKDu presents without the traditional causal factors (hypertension, diabetes, NSAID use, etc.), and with a unique pathophysiology called interstitial tubular nephritis. There are several hypothesized causal environmental factors including heat exposure. Heat contributes to dehydration, inflammation from heat stress, subclinical rhabdomyolysis, and crystalluria. All of these can damage the kidney and inhibit its function over time through repeated acute kidney injury (AKI). It is hypothesized that these repeated injuries result in decreased kidney function over time and eventual progression to CKD.

Objective: This systematic review sought to determine the association of heat exposure and kidney function in agricultural workers.

Methods: A search of PubMed and Scopus was performed on October 5, 2022. 206 results were screened by title and abstract, 29 were then screened by full text and assessed for inclusion criteria (prospective longitudinal cohort study, validated exposure assessment, validated outcome assessment, taking place in North and Central America). Of those studies, six were included in this review. Study findings were compiled and assessed for statistical significance and direction of association. A risk of bias assessment was performed for individual study. Finally, quality of evidence assessment, and strength of evidence rating were performed. This review was performed using the Navigation Guide methodology for systematic reviews.

Results: Five of the six studies found a positive association between heat exposure and decreased kidney function, four of these findings were statistically significant at the p<0.05 level or lower. Only one study found a negative association between heat exposure and decreased kidney function and this finding was not statistically significant. Based on the findings, sufficient evidence exists to support the hypothesis that heat exposure is associated with decreased kidney function in agricultural workers. Protecting agricultural workers from excessive heat exposure will help to prevent AKIs and CKDu in the long run. Further research is warranted to explore other possible causal component factors such as pesticide exposure and bacterial or viral agents.

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GWSPH RESEARCH SHOWCASE

ENVIRONMENTAL AND OCCUPATIONAL HEALTH

Proximity to Green Space and Mental Health Outcomes in Urban Environments within the United States: A Systematic Review

Objectives: This systematic review explores how exposure to green space impacts the well-being or mental health of humans residing in urban environments within the United States. This study seeks to answer the question: "How does exposure to green space within urban environments in the United States affect mental health outcomes?"

Methods: Using the Navigation Guide methodology, literature searches were conducted in PubMed, CINAHL, and ProQuest Environmental Science Database.

Results: 987 original records were captured for a title and abstract screening. Seven out of the nine studies included in this review suggest that exposure to green space reduces depression, anxiety, and stress levels among participants included in the study.

Discussion: This review demonstrated the gap in the literature assessing green space exposure and mental health outcomes within the United States. Studies included were based out of the United States and varied in how green space and mental health outcomes were measured and recorded. While it is unlikely, there is potential for additional confounding variables in future studies to alter the results concluded in this review.

Conclusion: Through the application of the Navigation Guides' systematic review methodology, we conclude that there is "limited" evidence that people experience positive mental health outcomes including decreased anxiety, depression, and stress when exposed to green space within urban environments in the United States. Further research is necessary to set a foundation for data-driven targeted interventions or policies regarding implementing more green spaces within urban environments in the United States.

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GWSPH RESEARCH SHOWCASE

ENVIRONMENTAL & OCCUPATIONAL HEALTH

Estimating the contribution of food-animal *Escherichia coli* among bloodstream infections globally

Introduction: *Escherichia coli* is one of the leading causes of bloodstream infections and accounts for more than half of community-acquired bacteremia cases (1). Evidence suggests that food producing animals may be an important source of human extraintestinal pathogenic *E. coli* infections (2). However, the burden of foodborne zoonotic *E. coli* (FZEC) in bloodstream infections remains unknown, especially in low- and middle-income countries.

Methods: In this study, we estimated the contribution of FZEC in all *E. coli*-caused bloodstream infections from Enterobase (a global *E. coli* genome collection). A novel Bayesian latent class model trained on 17 previously defined host-associated mobile genetic elements (3) was applied to 3,414 *E. coli* whole genome sequences to identify FZEC strains.

Results: Genomes were available for bloodstream isolates from 37 countries, collected 1985 to 2022; 93.5% (n = 3,192) of genomes were from high-income countries. Our model identified 808 FZEC strains among the collection, accounting for 23.7 percent of *E. coli*-caused bloodstream infections. FZEC infections accounted for a smaller percentage in high-income countries (22.6%) than in low- and middle-income countries (38.7%), which were grossly under-represented in this collection.

Conclusion: Our preliminary results suggest that FZEC comprises a meaningful proportion of bloodstream infections globally. Transmission of *E. coli* between food animals and humans may be more prevalent in regions characterized by poor water, sanitation, and hygiene and more intense human-animal interactions (such as subsistence farming). A greater effort must be made to collect and characterize *E. coli* from poor-resource regions in low- and middle-income countries around the world.

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GWSPH RESEARCH SHOWCASE

EPIDEMIOLOGY

Evaluation of treatment conditions for anti-trypanosomatid drugs

Background: Trypanosomatid parasites have an extensive global burden on human and livestock, but African trypanosomiasis specifically plays a large economic role in Sub-Saharan Africa. While vector control has successfully reduced the caseload of human African trypanosomiasis (HAT) and animal trypanosomiasis, chemotherapeutics remain are required for treatment of these fatal infections. Available drugs are associated with challenging treatment regimens (mostly IV administered), host toxicity, and increasing drug resistance. Drug resistance is most commonly associated with transporter mutations and prodrug enzymatic activation. However, for most anti-trypanosomatid drugs the mechanism of action is largely unknown and, moreover, the precise effects of drugs on parasite cytotoxicity have not been delineated. Therefore, alternative mechanisms of drug resistance are likely and determining the molecular mechanism of existing drugs will uncover therapeutic alternatives.

Methods: One approach toward understanding both drug mechanisms and resistance is forward genetic screening to identify genes whose expression promotes survival during drug treatment. We have generated a whole-genome inducible expression library for the African trypanosome parasite *Trypanosoma brucei brucei*, that enables the identification of genes whose induced expression promotes survival and drug resistance. Conducting forward genetic screens requires the careful elucidation of the timing and treatment conditions (drug concentration) for each drug to be investigated. In addition, knowing the precise timeline to cell death during drug treatments enables detailed analysis of death associated phenotypes toward uncovering the molecular basis of drug activity. Here, we take the first step toward these analyses by delineating the precise outcomes of drug treatments on parasite death.

Results: In this study, we focused on 4 drugs eflornithine (an ornithine decarboxylase inhibitor) and 3 nitroaromatic drugs - nifurtimox, benznidazole, and fexinidazole, which are predicted to cause cell death through DNA damage. To ascertain how these drugs kill the parasite *in vitro*, we monitored the cumulative growth effects of each drug (starting at concentrations derived from published literature) over 5 days. This established the final concentrations of drugs that were appropriate for killing parasites over that time frame. These data were then applied to “death flasks”, which emulate the conditions of a genetic screen by evaluating how parasites die over a 12-day period.

Conclusions: This data established the timing and drug concentration associated with death of the entire parasite population at between 3-5 days, which is ideal for forthcoming genetic screens. This work is also being actively applied to the evaluation of death associated phenotypes such as cell cycle.

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GWSPH RESEARCH SHOWCASE

EPIDEMIOLOGY

Evaluating the Impact of Substance Use on Viral Suppression and Self-Reported ARV Adherence among PWH, DC Cohort

Background: Substance use (SU) disorders are prevalent among PWH and are associated with worse HIV-related outcomes, specifically lower antiretroviral (ARV) adherence and achievement of viral suppression (VS). The patient-reported outcomes survey (PROs) was implemented within the DC Cohort Longitudinal HIV Study to recognize and treat SU disorders and improve HIV-related outcomes. We performed a cross-sectional analysis of PROs SU and HIV-related outcomes.

Methods: Self-reported SU is measured with the Alcohol Use Disorder Identification Test and the WHO Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST). Risk score frequency was categorized as low, moderate, and high-risk by substance. Unadjusted models determined the association between demographic factors, ARV adherence, and VS. Multivariable logistic regression models were used to determine the effect of ARV adherence on VS by each SU type.

Results: 868 completed PROs (median age 56 years, 75% Black). 65% reported alcohol use, 64% reported cannabis use, and 36.8% cocaine use. Additional substances were reported at <18%. HIV RNA results were available for 763 participants within 24 months of survey. Increased ARV adherence corresponded to higher VS (OR:1.5;95%CI:1.4-1.7)). Participants reporting inhalant use were likelier to report >80% ARV adherence and greater VS ($p<0.05$). After adjusting for age, employment, and housing, participants with >80% ARV adherence were over 5 times more likely to be VS ($p<.0001$). Multivariable models [Figure] of VS stratified by drug type identified a decreased likelihood of VS for high-risk opioid use (OR:0.43; 95%CI:0.07-2.79) and moderate (OR:0.32; 95%CI:0.16-0.65) to high-risk cocaine use (OR:0.32; 95%CI:0.07-1.63).

Conclusion: Opioid and cocaine use may reduce the probability of VS, even among PWH reporting high ARV adherence. Research is ongoing exploring polysubstance use defined by ASSIST scores and ICD-9/10 billing codes to validate current SU.

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GWSPH RESEARCH SHOWCASE

EPIDEMIOLOGY

A Latent Class Analysis of Substance Use and Longitudinal HIV RNA Patterns among PWH in DC Cohort

Background: People with HIV (PWH) with substance use (SU) disorders have worse health outcomes than PWH without SU disorders. Our objective was to characterize SU patterns and their impact on longitudinal HIV RNA trajectories among PWH in care in Washington, DC.

Methods: Data from PWH aged >18 years enrolled Jan 2011-Mar 2018 in the DC Cohort, a longitudinal observational study of PWH in care at 14 clinics in Washington, DC, were analyzed. Data were abstracted from participants' electronic medical records. SU by type (alcohol, cannabis, opioid, stimulant, hallucinogen, inhalant, sedative) were used to identify shared patterns of SU using Latent Class Analysis (LCA). A multinomial logistic regression model was used to evaluate the association between the resulting SU classes and the probability of membership in longitudinal HIV RNA trajectory groups.

Results: 30.1% of participants had SU reporting at least one substance used. LCA resulted in three-class model (1) No Illicit Substance Use; (2) Opioid Use; and (3) Polysubstance. The Opioid and Polysubstance Use classes were more likely to have a mental health diagnosis (45.4% and 53.5%; p <.0001). Members in the Opioid Use class were older, with a median age of 54.9 years (IQR: 50.3-59.2) than both the Polysubstance and No Illicit SU Classes (p <.0001). There were 3 HIV RNA trajectory groups 1) Undetectable, 2) Suppressed, and 3) Unsuppressed HIV RNA over 18 months of follow-up. The probability of being in the unsuppressed HIV RNA group trajectory when a member of the Opioid Use or Polysubstance Use classes was 2.29 times and 1.55 times greater than the No Illicit Substance Use class, respectively.

Conclusion: The Opioid use and Polysubstance use classes, with higher-risk drug use, should be approached with more targeted HIV-related care to improve outcomes.

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Predictors of Treatment Completion Status in a Pediatric Behavioral Health Clinic at a Large Urban Children's Hospital

Background: Early childhood is a critical period in physical and psychological development. Effective treatment can provide children and families with solutions and hope for a healthy future. However, some families may experience greater barriers to treatment success. Identification of potential predictors of treatment completion may lead to supportive solutions for children and families.

Method: At a pediatric behavioral health clinic in a large urban children's hospital, a retrospective cohort study was conducted to examine the association between race, insurance type, wait-time for first visit, and ratio of no-shows to attended appointments with treatment completion status. Participants were seen or referred to the clinic between July 1, 2021 to June 30, 2022.

Results: The study included 88 patients. Associations between race, insurance type, and wait-time with treatment completion were not statistically significant. Association between the ratio of no-shows to attended appointments with treatment completion was found to be significant ($p = 0.002$) with an odds ratio of 0.31 (95% CI 0.14, 0.66).

Conclusions: The findings of this study can be used to evaluate clinic patient demographics and to inform clinic policies in an attempt to improve identification and support of vulnerable families as they navigate behavioral health treatment. This study ultimately has the hope of positively impacting clinic graduation rates and bettering the behavioral outcomes of children and families in the community.

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GWSPH RESEARCH SHOWCASE

EPIDEMIOLOGY

Acute sexual violence exposure dysregulates HIV associated cervical immune biomarkers in women

Background: There is considerable overlap between the epidemics of violence against women and HIV/AIDS, both of which adversely and disproportionately affect women's health. Sexual violence is associated with increased risk of HIV acquisition/transmission in women, yet the immune-biological mechanisms linking the two are poorly understood. Specifically, it is unknown how genital tract regulation of these immune biomarkers associated with HIV infection and pathogenesis may be affected following sexual trauma. The objective of this study was to compare the levels of inflammatory cytokines/chemokines and protective/anti-inflammatory/HIV inhibitory factors, in the genital tract of women exposed to sexual violence, compared to those who have never been exposed.

Methods: Recruitment for this longitudinal and cross-sectional study was performed in the District of Columbia metro area from 2014-2016 and consisted of women aged 18 and above. After administering informed consent, eligibility was determined using a brief survey, with Recent Cases being defined as women having experienced forced vaginal penetration during the preceding 12-weeks. Controls were defined as women who had never experienced forced vaginal penetration. Acute Cases were defined as women having experienced forced vaginal penetration during the past 4 days. Those eligible provided biological samples including ectocervical swabs for biomarker analysis. Protective/anti-inflammatory/HIV inhibitory biomarkers Serpin A1, Elafin, Secretory Leukocyte Protease Inhibitor (SLPI), and Human Beta-Defensin-2 (HBD2) were analyzed by ELISA. Inflammatory cytokines IL6, IL1β, IL1α, TNFα, and chemokines MIP3α, IL8, and IP10 were also analyzed similarly. ANOVA and Kruskal-Wallis tests were used to determine differences between Recent Cases, Acute Cases, and Controls using GraphPad Prism.

Results/Conclusions: In Acute Cases, 4 days post event, we observed significant upregulation in levels of inflammatory cytokine/chemokines IL1α ($p<0.0001$), MIP3α ($p=0.0001$), IL8 ($p=0.0149$), as well as anti-inflammatory Serpin A1 ($p=0.0002$), Elafin ($p=0.0012$) and SLPI ($p=0.0351$) compared to Controls. Interestingly, inflammatory cytokine IL6 ($p=0.0048$) and chemokine IP10 ($p=0.0393$) were significantly downregulated in Acute Cases compared to Controls. None of these biomarkers were significantly different in Recent Cases (12 weeks post event), compared to Controls. Our data points to immune dysregulation in the female genital tract following exposure to sexual violence, which has the potential to increase HIV risk in this population.

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GWSPH RESEARCH SHOWCASE

EPIDEMIOLOGY

Addressing the Mpox Outbreak in Washington, DC: Insights from Surveillance Data and Vaccine Administration Strategies of DC Health

Background & Significance: On February 1st, 2023, over 30,000 confirmed cases of the 2022 Mpox outbreak were reported in the US. The virus was transmitted through social and sexual networks of gay, bisexual, and other men who have sex with men, with a high incidence rate among people with HIV. To mitigate the outbreak, at-risk populations are being vaccinated with the JYNEEOS vaccine.

Objectives: The study aims to describe the clinical and sociodemographic characteristics of the Mpox cases and JYNNEOS vaccine recipients in Washington, DC. It evaluates potential differences and the overall efforts to curb the outbreak in DC.

Methods: We conducted a case series study of confirmed mpox cases reported to DC Health between May 24th, 2022, and December 3rd, 2022. Sociodemographic data were obtained from medical records and patient interviews. Mpox vaccination records were ascertained from the same period. We used descriptive statistics to summarize sociodemographic characteristics for cases and vaccinations and evaluated the occurrence of infection among individuals who received at least one or both doses of the vaccine.

Results & Conclusion: In Washington, DC 525 cases of mpox were reported, with 96.4% were male, 40.2% non-Hispanic or Latinx Black/African American, 51.1% gay, and 56.8% HIV negative. Adults aged 30-34 years (25.5%) and residents of Ward 1 (21.9%) and Ward 2 (21.5%) were the most affected. During the study period, 38,767 JYNNEOS vaccinations were administered, with higher rates among male (88.7%), non-Hispanic White Americans (54%), gay (79.3%), those without HIV (86.1%), aged 30-34 years (20.1%), and residents of Ward 1 (21.1%) and Ward 2 (21.6%). Among those who received at least one dose, 47.5% experienced infection, while 14% individuals experienced infection after completing the two-dose regimen. Non-Hispanic Black/African Americans were disproportionately impacted by the outbreak, while vaccination efforts were most successful among non-Hispanic White Americans. Higher infections were observed after receiving at least one dose as compared to both doses of vaccine.

Significance of Research: This case series provides a rapid overview of the Mpox outbreak and vaccination efforts in Washington, DC. The data can help model attitudes towards vaccine acceptance and completing the two-dose regimen among high-risk populations, based on the epidemiological profile of cases and vaccine recipients.

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IS THE MPOX OUTBREAK DISPROPORTIONATELY AFFECTING DC RESIDENTS? A Quantitative extrapolation of Severity of Symptoms by HIV Status and Racial Stratification in JYNNEOS Vaccine Administration

Background & Objective: This study aimed to investigate two specific aims related to the 2022 Mpox outbreak in Washington, D.C. The first aim was to determine the association between HIV status and fever among adults above 18 years who tested positive for Mpox during the outbreak. The second aim was to evaluate the racial and ethnic disparities in JYNNEOS vaccine administration among the residents of D.C.

Methods: The study used a cross-sectional design with data collected from electronic medical records and patient interviews. A logistic regression analysis was conducted to determine the association between HIV status and fever. Descriptive analysis and chi-square tests were used to evaluate the racial and ethnic disparities in vaccine administration.

Results: The cases cohort consisted of 273 individuals with a mean age of 34.53 years and a male majority. Most cases were concentrated in Wards 1 and 2 which have a predominantly White population. The analysis showed that individuals with negative HIV status were more likely to report experiencing fever during illness compared to those with positive HIV status. The analysis of vaccine administration disparities based on race and ethnicity in D.C. showed that the White population had a higher vaccine uptake than other racial groups. In contrast, the Black population exhibited a significant percentage gap in vaccine administration, which was disproportionate to their representation in the total population of D.C.

Conclusion: The results of this study indicated that no significant associations were found between HIV status and fever during illness among individuals with Mpox. Additionally, the study highlights the existence of racial and ethnic disparities in vaccine administration in D.C. These results can inform public health interventions aimed at reducing the burden of infectious diseases and addressing health inequities in the population.

Significance of Research: This research contributes to our understanding of the intersection of infectious diseases, HIV status, and race and ethnicity, and provides valuable insights for public health practitioners and policymakers. It demonstrates the importance of collecting and analyzing data on health disparities to identify and address gaps in healthcare access and outcomes. Addressing the disparities can improve vaccination coverage and reduce the burden of infectious diseases in vulnerable communities.

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Leveraging Endogenous Retrovirus Expression to Elicit an Interferon-Mediated Antitumor Immune Response in Ovarian Cancer

Background: Ovarian cancer (OC), which is characterized by an immunosuppressive tumor microenvironment, is the 5th deadliest cancer in women due to poor immune infiltration and high rates of therapeutic resistance. To improve OC therapeutic response, DNA methyltransferase inhibitors (DNMTi) have been developed which have shown increases in immune cell recruitment and activation in the tumor microenvironment. DNMTis work by reducing DNA methylation and have shown to activate transposable elements and downstream type I interferon signaling. This response, termed viral mimicry, is driven by the transcription of transposable elements which form dsRNA that mimics cellular viral infection. An antagonist to this process, adenosine deaminase 1 (ADAR1), degrades the dsRNA and inhibits the type I IFN response. To potentiate antitumor immunity in OC, a combination treatment of ADAR1 knockdown and DNMTi will be used to trigger a viral mimicry response that upregulates interferon stimulated genes (ISGs).

Methods: ADAR1 expression in ID8-B cells will be knocked down using a thiol conjugated small interfering RNAs (siRNAs) targeting ADAR1 tethered to glutathione capped Prussian Blue Nanoparticles. The knockdown of ADAR1 will be confirmed using western blot analysis. The knockdown and wildtype ADAR1 ID-8B cells will then be mock or 5-azacytidine (DNMTi) treated and resulting RNA transcripts will be isolated. To confirm the degree of ISG expression between groups, RNA will be reversed transcribed to cDNA and qRT-PCR amplified using primers targeting specific ISGs.

Results: The combination of DNMTi and ADAR1 knockdown shows the largest increase in ISG induction compared to either treatment alone.

Conclusions: High grade serous ovarian cancer has a 5-year survival rate and has remained unchanged for decades and novel therapies are needed. In this study, we tested nanoparticle delivered siRNA against ADAR1 in combination with a DNMTi, 5-azacytidine, to assess changes in immune cell activation in a high-grade serous ovarian carcinoma model. We have demonstrated that the use of epigenetic therapy combined with ADAR1 inhibition can result in a effective antitumor response in ID8-B murine cells.

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GWSPH RESEARCH SHOWCASE

EPIDEMIOLOGY

SARS-CoV-2 Variant Surveillance in our GWU Community by TaqMan qRT-PCR assay and Next-generation Sequencing

Background: As of March 2023, infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has accumulated to >676 million cases worldwide. SARS-CoV-2 is a single-stranded RNA virus whose genome is ~30kb. This virus has a high mutation rate, resulting a rapid rise of new variants with higher transmission rates. Identifying new variants in a community is important for assessing risk and creating policy. Our goal was to develop an approach to rapidly identify emerging variants efficiently and cost-effectively from SARS-CoV-2 PCR-positive nasal specimens.

Methods: Inactivated RNA extracts from SARS-CoV-2 PCR-positive nasal specimens (Ct <28) identified by the GWU Public Health Testing Lab were provided to us for TaqMan-based screening to detect N501Y mutation and HV69-70 deletion. Variants can be distinguished because these mutation/deletion combinations do not overlap. Amplicon-targeted Next-generation sequencing (NGS) of the Spike gene or whole genome sequencing (WGS) were performed on samples with inconclusive N501Y mutation and HV69-70 deletion TaqMan results. Bioinformatics data analyses were then performed using DRAGON COVID lineage (Illumina) and NextClade (Nextstrain) for variant identification.

Results: Since March 2021, we have screened 2,204 SARS-CoV-2 PCR-positive nasal specimens using TaqMan qRT-PCR and submitted 42 different SARS-CoV-2 whole genome sequences to GISAID for public sharing. Timeline for identifying these variants was: (i.) Between March and mid-December 2021, 555 samples were screened for variant identification. (ii.) On June 3, 2021; first case from Delta variant (21A) was identified at GWU, which dominated cases in our community for the first 6 months of performing molecular surveillance (iii.) On December 9, 2021; first case from Omicron variant was identified within our community and Washington, DC from a sample collected on November 29, 2021. Within 22 days (11/29/21-12/20/21) of identifying this first Omicron variant, it dominated cases here. Since then, several other Omicron sub-variants having emerged, with XBB.1.5 being the current Omicron variant dominating infections globally, including here in the United States.

Conclusion: It has been 3+ years since the worldwide "Invasion" of SARS-CoV-2 pandemic. Since then, after investing tremendous resources, improved diagnostic testing, vaccines, and therapies have been developed to fight against challenges from this constantly evolving virus to better understand this SARS-CoV-2 virus. During this time, a real-time surveillance system was set up for our community that allowed for both rapid and cost-effective screening to identify new variants, allowing the GWU Volunteer SARS-CoV-2 task force to make timely decisions and keep our community safe.

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Examining Perceptions of Screening for HIV, PrEP, & COVID Vaccinations for Racial, Ethnic, Sex, and Gender Minorities in Clinical Settings

Background & Significance
During the COVID pandemic, human immunodeficiency virus (HIV) has received significantly reduced attention. COVID and HIV are also remarkably and similarly stigmatized, disproportionately impacting the health of racial, ethnic, sexual, and gender-minoritized patients. This stigma stems from fear and misinformation - two factors best addressed in the primary care setting.

Purpose
This study aimed to determine facilitators and barriers to HIV, PrEP and COVID vaccination screenings for minoritized populations in clinical settings to inform continuing medical education training modules for primary care practitioners (PCPs) in the U.S.

Methods
Our qualitative pilot study utilized semi-structured interviews. Patients (n = 9) who identified as racial, ethnic, sexual and gender minoritized individuals were recruited via online surveying. PCPs (n = 6) were recruited via convenience sampling. The 15 transcripts were coded for facilitators and barriers and organized using the Socio-Ecological Model (McLeroy, et. al., 1988).

Findings & Conclusions
As PCPs commonly stated policy-based barriers to care, many patients raised concerns about PCP availability and access to the EMR and health literate material. Patients and PCPs agreed that community stigma was a barrier to care but had differing perceptions on its facilitators. PCPs did not acknowledge the agency of patients, while patients noted the exhausting nature of navigating racist healthcare systems. While patients considered the importance of PCP attitudes and behaviors, PCPs did not discuss any interpersonal factors. Depending on context and experience as a PCP or patient, some of the facilitators doubled as barriers.

Implications
Building the PCP-patient relationship can address stigma. Culturally Responsive Communication (CRC), which translates diversity, equity, inclusion, and justice through clinician reflexivity into patient interactions and antiracist care, can reshape the culture of medicine. Our call for CRC builds the capacity of PCPs to routinize screenings for highly stigmatized conditions. This research will also inform our CME-bearing training modules accessible to all U.S. clinicians.

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Bioengineering More Functional Enzymes One Amino Acid at a Time

Background & Significance
Protein regulation in multicellular organisms is not fully understood as there are many contributing components with diverse functions. The ubiquitination pathway is one regulatory mechanism responsible for tagging unwanted proteins to be degraded or modified by a proteasome. Certain zinc-binding enzymes involved in this pathway are the E3 ligases, RING and B-box1, which are associated with neurodegenerative diseases, cancer, and developmental disorders when mutated. The RING and B-box1 proteins of the MID1 domain are found to be associated with X-linked Opitz G/BBB Syndrome.

Purpose
Ubiquitination activity is measured by how much ubiquitin is added to target proteins for the adequate signaling to a proteasome. RING proteins have significantly more ubiquitination activity compared to B-box1, even though both enzymes have similar tertiary structures. After understanding the protein genomes, we mutated B-box1 proteins to be more like RING at the 120 and 122 positions to identify potential differences in ubiquitination activity levels. Changes in activity levels may expand our understanding of which of RING's amino acids are significantly responsible for ubiquitination.

Methods
We obtained our proteins of interest through E. Coli BL21DE3 bacteria where it was cloned into a plasmid vector and transformed. We then grew the bacteria and induced it to express our proteins of interest where it was then isolated via nickel-resin affinity purification. The eluted proteins were then concentrated to dialyze out imidazole, then flash-frozen with liquid Nitrogen. Ubiquitination activity of the proteins of interest were modeled through *in vitro* ubiquitination experiments and Western blotting.

Findings & Conclusions
RING proteins had significantly more ubiquitination activity that wild-type B-box1. D122Q mutated and F120I mutated B-box1 proteins showed more activity than wild-type B-box1. The D122Q-F120I double mutant showed significantly more ubiquitination activity than its B-box1 wild-type. There was inconclusive evidence for the activity levels in D122Q and F120I single mutants as we found contradictory results in different blots.

Implications
This project signifies how proteins can have enhanced functionality from differences in just a few amino acids. The increased activity caused by the double mutant can inform future studies on the impact of RING's amino acids at the 120 and 122 positions. Mutating the B-box1 domain with a few conserved amino acids found in specific locations in the RING domain confirm the importance of E3 ligase activity.

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GWSPH RESEARCH SHOWCASE

EPIDEMIOLOGY

Increased levels of plasma TNFα in transgender women on long-term gender-affirming hormone therapy

Background: Transgender women (TW) have a greater risk of acquiring HIV compared to cisgender men who have sex with men, after controlling for risk factors including age, depression, stigma, violence, and condomless receptive anal intercourse (RAI). The underlying biological mechanisms that contribute to the increased risk are not well understood, including the role of long-term treatment with synthetic estradiol (E2) as part of gender-affirming hormonal therapy (GAHT). In cisgender women, naturally produced E2 regulates multiple immune functions and is considered to be protective against HIV infection. However, the effects of long-term E2 use in those who are assigned male at birth (AMAB), have not been determined. Our objective in this study was to investigate whether long-term GAHT use is associated with increased systemic inflammation in TW.

Methods: We recruited 36 AMAB, of whom 22 identify as TW and have been on E2 therapy for at least six months (GAHT group). Our No GAHT group consisted of 14 participants AMAB with varying gender identities who were not on hormone therapy. Participants from both groups were HIV-negative, sexually active, not on pre-exposure prophylaxis (PrEP), and were recruited from the Washington DC metro area. Immune biomarkers in plasma samples were assessed by ELISA and included the following pro-inflammatory cytokines, chemokines, and anti-HIV antimicrobials: Interleukin 1-alpha (IL-1α), Interleukin-6 (IL-6), Tumor Necrosis Factor-alpha (TNFα), Interferon Gamma-Induced Protein (IP-10), Macrophage Inflammatory Protein 1-alpha (MIP1α), Myeloperoxidase (MPO), and Human Beta-Defensin-2 (HBD2). Statistical analyses compared biomarker values in the GAHT vs No GAHT group using the Mann-Whitney test (Prism 9.3.0).

Results: We observed that TNFα was significantly increased (p=0.0124) in TW on GAHT compared to No GAHT in plasma samples. However, IL-1α, IL-6, IP-10, MIP-1α, MPO, and HBD2 were not significantly different when comparing No GAHT use to long-term GAHT use in plasma samples.

Conclusion: Our data show that there is a significant increase of TNFα in TW plasma on GAHT compared to the No GAHT group. Increased levels of TNFα are indicative of systemic inflammation and play a critical role in HIV-1 pathogenesis. This finding suggests one possible mechanism that contributes to a higher risk of HIV acquisition in TW population on GAHT. Further research is needed to understand the impact of GAHT on immune pathways that may be dysregulated within TW.

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Willingness to Start Pre-Exposure Prophylaxis for HIV (PrEP) in an Emergency Department Setting

Background: Pre-exposure prophylaxis (PrEP) is an efficacious biomedical intervention that has the potential to reduce HIV incidence. Despite its promise, PrEP uptake has been modest, particularly among the groups at highest HIV risk. Slow adoption of PrEP is attributed to patient, provider and system factors such as patient lack of awareness, inadequate provider training, and medication cost if not covered by insurance. Novel strategies are needed to improve PrEP awareness, access, uptake and adherence. The Emergency Department (ED) is a unique clinical setting as it serves a substantial proportion of people at high-risk of HIV acquisition. Previous work suggests that there may be an opportunity for the ED to increase PrEP uptake and linkage to HIV preventive care. In this study, we aim to determine the feasibility and acceptability of PrEP delivery in an ED in an urban setting.

Methods: We are currently screening and enrolling GWU Hospital ED patients with chief complaints or diagnostic tests ordered in the ED indicative of HIV risk. We are offering PrEP education, a 10-day starter pack of Truvada/Descovy and arranging a follow-up appointment with a community PrEP provider (CPP) to those who are determined to be PrEP eligible per CDC guidelines following the completion of a self-administered survey and applicable laboratory tests. For PrEP-eligible patients who decline to start PrEP in the ED, we offer to arrange a referral visit to a CPP.

Results: Of the 71 patients approached in the ED between December 1, 2022-May 2, 2023, 52 (73%) agreed to be screened for study eligibility. 34 participants have been enrolled thus far. 19 (56%) participants were found to be behaviorally PrEP-eligible based upon survey responses. These PrEP-eligible participants were majority Black (58%), male (47%), and heterosexual (74%). Of the 19 PrEP-eligible participants, 8 (42%) agreed to receive a starter pack of PrEP in the ED, and 6 of these were clinically eligible to start PrEP in the EDI. These clinically eligible participants were majority Black (67%), male (67%), and heterosexual (67%). No PrEP-eligible participants opted only for a referral to a CPP.

Conclusions: The ED may be a suitable venue to identify PrEP-eligible patients who are willing to begin PrEP. Further research is warranted to substantiate these preliminary findings.

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Needs Assessment 2019 in the Department of Loreto in Peru

Background: Malaria is a significant public health issue in Peru, particularly in the Loreto department, where the incidence of the disease is high. Despite efforts to promote malaria-safe behavior, education on malaria prevention and treatment remains inadequate in Loreto communities. Previous research has mainly focused on socioeconomic development and malaria-safe behavior in communities. This study aims to fill the gap by conducting a needs assessment of a community clinics in Loreto to identify the main issues and help Selva in Action (SIA) develop potential solutions.

Methods: This independent research aims to develop a needs assessment from a 2019 survey conducted by UIC and Selva in Action in the Peruvian Amazon health posts, specifically in a rural community in the Loreto Department. The data was cleaned using Excel, then analyzed and presented using Python, which allowed for the creation of graphs to illustrate the main issues identified by the study.

Results: The survey data were collected from 154 participants, and it identified three main issues: identifying malaria as a problem, the at-risk Punto Alegre community and health post, and the need for malaria education. These issues were identified by a majority of participants, with over 22% of respondents indicating that they needed more information on malaria prevention and treatment. Based on these findings, the study recommends involving the Punto Alegre communities and leaders in all aspects of planning and implementation of malaria education programs. The study also suggests training personnel on the epidemiology, prevention, diagnosis, and treatment of malaria, and establishing a malaria newsletter for injection sites and workshop education on malaria prevention actions and treatment.

Conclusion: The findings of this study highlight the urgent need for improved education and prevention efforts regarding malaria in Loreto communities. The proposed recommendations, which include involving the Punto Alegre communities and leaders in all aspects of planning and implementation of malaria education programs, training personnel on the epidemiology, prevention, diagnosis, and treatment of malaria, and establishing a malaria newsletter for injection sites and workshop education on malaria prevention actions and treatment, could help reduce the incidence of malaria in the region and improve the health outcomes of those affected by this disease. However, implementing these interventions may face challenges such as resource limitations and community engagement, which need to be addressed to ensure their effectiveness.

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Sexual Health of Transgender Men on Testosterone

Background and Purpose: Extent to which gender-affirming hormones, specifically testosterone for transgender men, affect one's immune system is not well established. A weakened immune system increases risk of acquiring infectious diseases. To that end, we studied prevalence of two common sexually transmitted infections (STIs), high-risk HPV (hrHPV) and *Trichomonas vaginalis* (TV), in a population of transgender men and compared their rates to a control group of cisgender women. HPV infections are among the most common STIs in the USA, with HPV16 and HPV18 being associated with ~90% of cervical cancers and ~80% of anal cancers. TV is a single-celled protozoan that can inhabit the vagina and rectum, with a prevalence rate that is often higher than *Neisseria gonorrhoeae* and *Chlamydia trachomatis* combined. Therefore, determining whether there is a correlation between using testosterone as a gender-affirming hormone and an increased risk of STIs could be relevant for individuals that depend on this form of care.

Methods: Thirty transgender men on testosterone and 30 cisgender women were recruited to participate in this study. Each participant provided three self-collected specimens; oral, anal, and vaginal swabs. DNA was extracted from each sample type. An isothermal amplification assay, AmpFire High Risk HPV Genotyping Assay, was used to detect DNA from 15 different hrHPV genotypes and an endogenous human gene target (internal control) from all 3 sample types. Lab developed qPCR TaqMan assay was used to screen anal and vaginal specimens for TV DNA.

Findings and Conclusions: Adequate cellularity (valid IC results) was found for all self-collected oral and vaginal samples from both groups, while invalid results were seen for self-collected anal samples from transgender men (10%, 3/30) and cisgender women (6.7%, 2/30). Interestingly, we found more than a three-fold higher prevalence of hrHPV in vaginal swabs from transgender men on testosterone (33.3%, 10/30) compared to cisgender women (10%, 3/30). Similar hrHPV prevalence rates for were seen in anal swabs from transgender men (14.3%, 4/28) and cisgender women (18.5%, 5/27). No hrHPV DNA was detected in oral swabs from transmen (0%, 0/30) compared to cisgender women (10%, 3/30). No TV DNA was detected in anal or vaginal samples from both groups. The higher rate of hrHPV vaginal infections in transgender men using testosterone could suggest that this population is more susceptible to certain STIs. This finding may serve as a starting point for future research to establish the care that people who use gender-affirming hormones require.

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GWSPH RESEARCH SHOWCASE

EPIDEMIOLOGY

Risk Factors for Internalized Stigma among People with HIV in the DC Cohort

Stigma, which occurs when an aspect of an individual is discredited or devalued, has been associated with HIV since the beginning of the epidemic. While externalized stigma is when negative attitudes and beliefs are directed at someone, internalized stigma occurs when an individual starts to believe and internalize those attitudes about themselves. Internalized stigma is negatively associated with psychological and physical well-being and can lead to health-related consequences. Given the high prevalence of internalized stigma reported by people with HIV (PWH), it is important to understand factors that may be associated with increased stigma and ultimately develop an intervention to reduce it. The purpose of our study was to evaluate the factors that may be associated with internalized stigma among PWH.

The DC Cohort is a longitudinal cohort of people with HIV (PWH) receiving care in the DC area. The dataset provides information on patient prescriptions, comorbidities, and other social determinants of health. We evaluated internalized stigma among a subset of DC Cohort participants who answered a Patient Reported Outcomes (PROs) survey. Using linear regression modeling, we then determine which participant characteristics may be associated with increased levels of internalized stigma.

The 695 study participants were majority male (70.7%), non-Hispanic Black (74.7%), had a mean age of 54.4 years, and were diagnosed with HIV for an average of 19.3 years prior to participating. Stigma scores were moderately low among participants, but “feeling ashamed of having HIV” was the most prominent driver of internalized stigma. The linear regression model included age, years since HIV diagnosis, generalized anxiety disorder, depression, and gender. An age-gender interaction demonstrated that age was associated with lower stigma only among female and transgender individuals. Generalized anxiety and depression were associated with higher levels of stigma (0.12 (95% CI: 0.08, 0.187); 0.02 (95% CI: -0.01, 0.04)) while an increase in years since HIV diagnosis was associated with lower stigma (-0.02 (95% CI: -0.03, -0.01)).

These findings show that younger PWH who identify as female or transgender may experience higher levels of internalized stigma. Furthermore, newly diagnosed PWH and those with poor mental health may also be at higher risk for internalized stigma. Future interventions should further explore the causes behind these associations and created targeted interventions to reduce internalized stigma among these high-risk groups.

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GWSPH RESEARCH SHOWCASE

EPIDEMIOLOGY

Evaluation of Trypanosoma brucei parasite cell cycle phenotypes during anti-tryapnosomatid drug treatments

Background: Treatment for diseases caused by kinetoplastida parasites currently rely on a small number of clinically relevant drugs. Among them Human African Trypanosomiasis (HAT), or African Sleeping Sickness, is caused by *Trypanosoma brucei* and is fatal if not treated. Over 1 billion people across the globe are at risk of infection with kinetoplastida parasites. While current treatments exist, including eflornithine and a group of nitroaromatic drugs (nifurtimox, benznidazole, fexinidazole), they have severe adverse side effects, are burdened with complex treatment regimens, and are threatened by emerging drug resistance. Developing new drug therapies to combat HAT is imperative. However, a knowledge gap around the Mechanism of Action (MoA) of anti-trypanosoma drugs limits development of more effective therapies.

Methods: To address the knowledge gap in drug MoA, the cytotoxic effects of anti-trypanosomatid drugs were evaluated by the parasites cell cycle progression during drug treatment. A long-standing hypothesis exists that nitroaromatic drugs result in cell death via reactive oxygen species (ROS) induced DNA damage, we predicted that different drug treatments have specific impacts on cell cycle progression. *T. brucei* cells were treated with anti-trypansomatid drugs *in vitro* and cell cycle defects were analyzed by flow cytometry after being formaldehyde fixed and then stained with propidium iodide to report DNA content per cell. Thus, evaluating the number of cells in G_1, S phase, and G_2.

Results: We found that nifurtimox and benznidazole had similar cell cycle defects, characterized by a statistically significant G_2 loss, suggesting DNA damage. Fexinidazole demonstrated a unique phenotype among the nitroaromatic compounds, as shown by a significant decrease in S phase cells, implicating a DNA synthesis defect. In contrast, eflornithine, an ornithine decarboxylase inhibitor, exhibited a decrease in cell populations in G_1 and S phase.

Conclusions: This research sought to evaluate the kinetics of *T. brucei* death during four anti-trypanosomatid drug treatments and compare how the outcomes of those treatments impact the parasites cell cycle progression. While nitroaromatic compounds are chemically similar, our data suggest that they kill parasite cells through distinctive mechanisms. This data generated provides new insights into the effects of anti-trypanosomatid drugs on parasite viability which will be used in subsequent studies to identify novel drug targets with similar MoAs.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCES

Toward sustaining children's sport participation: Leveraging players' insights of what makes tennis fun

Background: The immediate and consequent benefits of positive sport experiences are well established (Bailey et al., 2013; World Health Organization, 2020). One of the biggest challenges, though, facing sport national governing bodies (NGBs) is maximizing play and enjoyment in ways that drive participation, and in turn, retention. Centering play and practice activities on having fun is among the key evidence-based recommendations for keeping individuals engaged in sport (Côté & Hancock, 2016). What makes it fun has been the source of inquiry by team sport NGBs, and in turn, empirically investigated in soccer, ice hockey, and basketball (e.g., Visek et al., 2015, 2020a 2020b). However, individual sports, like tennis, vary considerably from team-based sports. Thus, individual sport NGBs, like the United States Tennis Association, need sport-specific information on which to position their action plans and retention strategies.

Methods: The current study used group concept mapping, an innovative mixed-method research design, and engaged an ethnically and racially diverse sample of junior tennis players (n = 667, ages 6-19, stratified by sex and skill level) to: (a) identify the full scope of determinants that make tennis fun, (b) structure the determinants in an organized way to elucidate key themes, and (c) assess each determinant's importance to having fun.

Results: As many as 120 fun determinants were identified and structured within 11 overarching cluster themes. The clusters, in order of most to least important, included: match play, positive coaching, working hard and learning, developing mental strength, staying active, sportsmanship, training with coach, ways of playing, hitting the ball, skill building, and bonuses.

Conclusion: What makes tennis fun is vast and multifactorial, spanning individual, interpersonal, structural, and community levels of the tennis ecosystem. The 120 determinants identified offer turn-key solutions for putting fun, player-centered experiences at the core of tennis programming. Notably, this study offers the first evidence that building mental strength plays a role in having fun and underscores the importance of keeping players active, energized, and moving. These findings, coupled with established physical activity guidelines for children's overall growth and development, have important implications for their health promotion through sport-based physical activities. Other key findings, including clusters and determinants of highest importance, provide the USTA and tennis NGBs worldwide with an evidence-base to guide and support their action plans and retention strategies to provide play and practice activities that are, importantly, fun.

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EXERCISE AND NUTRITION SCIENCE

The Fitness, Rest, and Exercise for Strength and Health (FRESH) Study: Impact of COVID-19 on cardiorespiratory fitness of college students

Background: The coronavirus family is well-reported to be responsible for acute respiratory tract infections, however, there is limited information about COVID-19 and cardiovascular health, especially in young adult populations. Therefore, the objective of this study was to examine potential associations between COVID-19 incidence and perceived and measured cardiorespiratory fitness among undergraduate students at a large urban university in the U.S.

Methods: This study utilized data from the FRESH Study, which measures health habits of undergraduate students at the George Washington University through a series of annual surveys and in-lab fitness testing. Survey data collected on two freshmen year cohorts from the 2021-2022 and 2022-2023 academic years (n=152) were used to examine the relationship between self-reported COVID-19 incidence and both perceived and measured cardiorespiratory fitness. The survey included questions on demographics, anthropometrics, general health, physical activity, and COVID-19 incidence. Laboratory cardiovascular fitness testing was assessed using the Bruce Submaximal Treadmill protocol among a sub-sample (n=28) of participants. Analyses included Student's t-tests for continuous variables, chi-square tests for categorical variables, and linear regression for sex-adjusted measured VO_2max.

Results: Among participants (80% female, mean age 18.9 years), 32.2% reported previous COVID-19 incidence. Of those who had COVID-19, 23.4% reported the perception that their cardiorespiratory fitness and ability to engage in physical activities was negatively impacted by COVID-19 incidence. These individuals generally perceived themselves as fitter (90.9% vs. 77.8%), were significantly more physically active (by ~54 min/day, p=0.004), and had higher cardiovascular fitness levels (36.16 mL/kg/min vs. 24.92 mL/kg/min, p=0.032).

Conclusion: Those who engage in more physical activity and perceive themselves as more cardiovascularly fit noticed a greater impact of COVID-19 on their ability to optimally engage in physical activity. Even though the impact of COVID-19 was not perceived by those who are less physically active, further study in this population is warranted given their lower cardiovascular fitness and whereby COVID-19 incidence could have greater long-term detrimental health impacts.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCES

Perceptions Regarding Healthy Eating, and Individual and Interpersonal Facilitators to Healthy Food Choices of Middle-Aged Central American Men: A Qualitative Study

Background: Poor nutrition is associated with increased risk for chronic diseases. Few United States (U.S.)-based studies have assessed the factors that facilitate Central American men's healthy eating decisions. This study explored middle-age, overweight or obese Central American men's perceptions of healthy eating and facilitators to healthy food choices.

Methods: The present study is part of a larger qualitative study that explored behavioral and social factors that facilitated and challenged middle-age, overweight or obese Central American men to engage in healthy nutrition and physical activity behaviors. In fall 2020 and spring 2021, 25 in-depth, qualitative individual interviews were conducted with participants who met the following criteria: first generation Central American immigrant men residing in Washington, D.C., BMI ≥25 kg/m^2, low income, not following a diet due to a medical condition, and married or partnered. Men were interviewed about their perceptions on the meaning of healthy eating, factors that influence their decisions to eat healthy foods, things they do since coming to the U.S. that helped them to eat healthy foods, and family influences on eating habits. Audio-recorded interviews were transcribed and then reviewed by two primary coders who developed the codebook. Transcripts were coded independently by the coders using NVivo v.12 and then reviewed by a third researcher. Coded transcripts were analyzed for themes both within and across codes.

Results: Participants had a mean age of 50.9±6.4 years. They perceived healthy eating as: (1) having a balanced diet (e.g., incorporating all food groups in their meals), (2) preparing homemade meals, (3) eating foods low in fat, added sugar, and sodium, and (4) not having diseases. Individual-level facilitators included: (1) eating self-regulation, and (2) healthy food choices derived from their home-country (e,g., eating tropical fruits). Interpersonal-level facilitators included: (1) wife/partner as a catalyst for healthy food choices (e.g., cooking healthy meals), and (2) other family members social support for healthy food choices.

Conclusion: Overweight or obese Central American men had a good understanding of what healthy eating was and linked healthy eating to absence of disease. Reducing food portion sizes and preferring to consume culturally traditional healthy foods in the U.S. were discussed as examples of individual-level facilitators of healthy eating. Wives/partners played a leading role in facilitating men's healthy food choices. Weight management interventions to promote healthy eating should capitalize on men's understanding of healthy eating. Interventions should also integrate spousal involvement given their perceived influence on men's food behaviors.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCES

The Fitness, Rest, and Exercise for Strength and Health (FRESH) Study: A Comparison of College Students' Perceived Health to Measured Health Metrics

Background: The transition to college is a stressful period that may impact the physical and mental health of students. A majority of U.S. undergraduate students do not meet recommended dietary and physical activity guidelines yet may perceive their overall health positively. We therefore examined the relationship between college students' perceived physical and mental health and key health markers at a large U.S. urban university.

Methods: Survey and laboratory data were obtained from the FRESH Study, which examines the longitudinal health habits of undergraduate students at The George Washington University. Data from first year students in the 2021-2022 and 2022-2023 academic years (n=152) were used to assess the relationship between perceived and measured health metrics. The survey included information on demographics, body mass index (BMI), perceived physical and mental health, stress, sleep quality, physical activity (PA), and food and beverage consumption. Laboratory fitness testing among a subset of participants (n=28) assessed body composition using Bioelectrical Impedance Analysis and Dual X-Ray Absorptiometry. Health markers were reported as frequency with associations measured using chi-square tests.

Results: Among participants (mean age of 18.9 years, 80% female), 57.3% rated their physical health as "better than good", whereas only 21.7% rated their mental health as "better than good". Nearly a third were not normal weight (32% by BMI; mean body fat of 19.5% and 33.7% for males and females, respectively) and a third do not meet the PA recommendation of 150 minutes of moderate-to-vigorous PA per week. Only 10.3% reported drinking more than one sugar sweetened beverage a day; however, 60.8% eat fast food more than one time per week. Participants felt high levels of accumulating stress 74.8% of the time, and 43.2% reported not getting at least 7 hours of good quality sleep. While there was no significant relationship between perceived physical health and these health metrics, there were notable relationships between perceived mental health and stress accumulation ($p<0.001$) as well as sleep quality ($p=0.002$).

Conclusion: Students tend to perceive their physical health as good but their mental health as subpar. Participants who report poor mental health are more likely to accumulate more stress and have worse sleep quality than their peers. There are suboptimal health habits that may not currently have an impact on students' physical health, but could manifest later in adulthood, requiring further research.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCE

Perceived Message Effectiveness of Sugary Drink Reduction Intervention Graphics

Background: Excess consumption of sugary drinks (SD) is associated with increased risk of dental caries, obesity, and cardiometabolic disease among children. A complex interplay of individual, family, community, environmental and macro-level factors contribute to disproportionately high SD intake and disparities in health-related outcomes among Black children. However, few interventions utilize a community-engaged approach to reduce SD intake in this population. This study examined the perceived message effectiveness (PME) of prototype intervention graphics developed to lower SD consumption and increase water intake among low-income, Black children in Washington D.C.

Methods: Children 11-14 years old (n=10) and their parents (n=7) were recruited from a pediatric primary care clinic in Ward 8 of Washington, D.C. Participants were shown messaging prototypes which were either educational (4 parent graphics, 3 child graphics) or informational (3 parent graphics, 5 child graphics); children were also shown graphics intended to be interactive and use challenges to encourage behavior change (3). Graphics were developed using information from prior research and other SD reduction campaigns with similar populations. For each graphic or message, participants responded to PME questions on a scale from 1 (strongly disagree) to 5 (strongly agree). Ranking questions asked whether the graphic made participants feel: (i) discouraged from drinking/providing SDs; (ii) concerned about SD health effects; (iii) unpleasant to drink SDs; (iv) graphics were believable; and (v) it caught their attention. Mean PME scores were calculated for each graphic, overall and for individual questions, and were compared within and across categories.

Results: Among parents, PME scores for educational and informational graphics were comparable (3.94 and 3.96). For educational graphics, the highest rated statements were “this grabbed my attention” (4.14) and “drinking sugary drinks are bad for my health” (3.70). Conversely, the highest score for informational graphics was for “this makes me concerned about the health effects of sugary drinks” (4.04). For children, PME scores were highest for educational content (3.40), followed by informational graphics (3.04), and interactive content/challenges (2.89). The highest rating being for “this caught my attention” (3.83, 3.62, 3.57).

Conclusion: Despite the small sample size, these findings offer valuable insight regarding effective messaging for SD reduction among Black youth in Washington D.C. and their parents. Graphics displaying the health risks of SD consumption and nutritional education were similarly effective for parents, while children rated educational messages most effective. Refinements to intervention graphics are underway, seeking to maximize PME to increase the efficacy of the intervention.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCES

Is consumption of low-calorie sweeteners associated with diet quality and energy intake among U.S. adults?

Objective: Low calorie sweeteners (LCS) are commonly used to replace added sugars in foods and beverages. However, their impact on the overall diet is unclear. The objective of this study was to investigate associations between LCS consumption, diet quality, and energy intake.

Methods: This cross-sectional analysis included data from 165,876 participants in the American Cancer Society (ACS) Cancer Prevention Study-3 (CPS-3) cohort. Participants completed a validated food frequency questionnaire in 2015. LCS intake (servings per day) was estimated using self-reported consumption of LCS-containing beverages (diet drinks, diet iced tea, non-caloric sweetener packets and light yogurt). Diet quality was assessed using the ACS Diet Score (2020) and Healthy Eating Index (HEI-2015). Multivariable linear regression was used to examine associations between LCS consumption, diet quality and energy intake. Base models were adjusted for age, sex, race/ethnicity, income and education; subsequent models were further adjusted for body mass index, physical activity and following a specific diet. Models with ACS Diet Score (or subcomponents) as the outcome were also adjusted for energy intake.

Results: Over two-thirds (68%) of the participants reported consumption of foods, beverages, and/or packets with LCS. LCS consumption was inversely associated with diet quality ($p<0.0001$) for both ACS Diet Score and HEI-2015 and positively associated with energy intake ($p<0.0001$). LCS consumption was associated with poorer scores for ACS Diet Quality subcomponents including fruits and vegetables ($p<0.0001$), red and processed meat ($p<0.0001$), and sugar-sweetened beverages, highly processed foods, and refined grains ($p<0.0001$), but was not associated with whole grains. LCS consumption was also associated with poorer scores for all HEI-2015 subcomponents (all $p<0.0001$) except total protein foods.

Conclusions: LCS consumption was associated with poorer diet quality and higher energy intake in a large cohort of U.S. adults. These findings suggest that although LCS do not contain sugar or calories, their consumption is unlikely to improve the overall diet. Further research to elucidate mechanisms that may explain these associations is needed to inform dietary recommendations for cancer prevention and general dietary guidance.

Funding Sources: This work was funded by the American Cancer Society. This work was also in part funded by a doctoral student fellowship (MFG) from the Sumner M. Redstone Global Center for Prevention and Wellness at the George Washington University Milken Institute School of Public Health.

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EXERCISE & NUTRITION SCIENCES

The Impact of a Multi-Month, Ultra-Endurance Backpacking Trek on Measures of Physiological and Psychological Recovery and Readiness: A Case Study

BACKGROUND: Self-supported backpacking treks are popular among experienced hikers, yet limited intra-event data describes why the conditions lead to a low success rate.
PURPOSE: Observe how the physiological and psychological markers of recovery and readiness adapt to a multi-month self-supported backpacking trek.
METHODS: An experienced backpacker (30.1yrs; 78.3kg; 179.1cm) completed a wilderness-based backpacking trek known as the Appalachian National Scenic Trail northbound thru-hike. The participant hiked 3,462km and 99,643m accumulated elevation gain over 139 days. Physiological and psychological data was recorded daily while on-trail using a research-validated mobile application with 7-d rolling averages calculated at 6 time points (BASE-, 1/4TK-, 1/2TK-, 3/4TK-, END-, and 4-WK-POST). Resting heart rate (RHR) and heart rate variability (HRV) were assessed using mobile application-based photoplethysmography (PPG). Sleep duration (SLP-D) and visual analog scale ratings of sleep quality (SLP-Q), mental energy (ME), muscle soreness (MS), and fatigue (FTG) were recorded with the mobile application questionnaire. Outcomes were assessed throughout the expedition in ¼-trek increments as percent changes (%CHG) from the week 1 trek baseline (BASE).
RESULTS: After 7-weeks, BASE SLP-D and RHR minimally improved with lower perceived FTG (SLP-D: BASE 8.15hrs/d, 1/4TK 8.40hrs/d, Δ3.0%; RHR: BASE 61.80bpm, 1/4TK 60.87bpm, Δ-1.5%; FTG: BASE 59.71, 1/4TK 53.17, Δ-11.0%), but SLP-Q, HRV, and ME decreased alongside greater MS (SLP-Q: BASE 48.71, 1/4TK 44.50, Δ-8.7%; HRV: BASE 85.0ms, 1/4TK 60.87ms, Δ-23.8%; ME: BASE 45.86, 1/4TK 43.79, Δ-4.5%; MS: BASE 49.29, 1/4TK 56.57, Δ14.8%) in response to the initial 1/4TK (865.6km). At trek END (3462.2km), the participant remained 1.15hrs (-14.15%) below daily BASE SLP-D with greater MS accumulation (18.8%) and reduced SLP-Q (-8.2%), HRV (-31.3%), and ME (-3.1%). Despite SLP-Q and MS improving with limited activity 4-WK-POST trek (SLP-Q: 51.57, Δ5.9%; MS: 45.14, Δ-8.4%), SLP-D, HRV, and ME continued to decline below BASE (SLP-D: 5.30hrs/d, Δ-35.0%; HRV: 49.43ms, Δ-41.9%; ME: 34.00, Δ-25.9%) with elevated RHR and perceived FTG (RHR: 63.89bpm, Δ3.4%; FTG: 67.00, Δ12.2%).
CONCLUSION: Sleep, recovery, and readiness regressed in response to the accumulated physical and psychological stress of the self-supported wilderness backpacking event with no impact on event completion. Perceived fatigue was not realized until trek end, whereas other recovery and readiness indicators continued to regress despite extended rest, relief of survival stress, and return to the built environment.
PRACTICAL APPLICATION: While control of intra-event recovery and resilience may be highly variable and individualized, an extended recovery and re-integration plan in this population is essential post-trek to manage compounding stress, fatigue, and injury potential.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCES

Assessment of HDL Function and Plasma Lipoprotein Profiles Following Acute Exercise of Differing Intensities

Background: High-density lipoprotein cholesterol (HDL-c) regulates blood cholesterol levels through reverse cholesterol transport (RCT). The ability of HDL to participate in cholesterol efflux is inversely associated with cardiovascular disease. Previous studies have shown chronic exercise may impact HDL function, but it is unknown how acute exercise impacts HDL function.

Purpose: To conduct a pilot analysis of HDL function before and after acute bouts of exercise differing in intensity.

Methods: Subjects (n = 6; 2 F, 4 M; Age = 25 ± 3 yr; BMI = 26.3 ± 2.8; VO_{2peak} = 40.2 ± 6.3 ml/kg/min) completed two exercise bouts with an energy expenditure of ~300 kcal at 55% and 75% of their individual VO_{2peak}. Blood collected PRE, POST, POST 2h, and POST 24H. HDL function was assessed via the 3H-cholesterol efflux assay using ApoB depleted serum. Serum lipoprotein profiles were generated via the LP4 NMR MetaboProfile deconvolution algorithm.

Results: Pilot analysis of HDL function following exercise at 55% VO_{2peak} PRE (1.14 ± 0.14), POST (1.21 ± 0.38), and POST 24 (1.23 ± 0.34) and 75% VO_{2peak} PRE (1.00 ± 0.23 POST (1.13 ± 0.21) and POST 24 (1.13 ± 0.32) demonstrated similar profiles. Due to small sample size all changes are non-significant ($p > 0.05$). HDL function following exercise (POST) shows an intensity dependent increase in HDL function immediately following exercise at 55% of maximal capacity as compared to 75% of maximal capacity (~5% increase in HDL function vs. 13% increase). A sustained increase in HDL function is noted 24 hours following exercise in both exercise trials in an intensity dependent manner (8% vs. 13%). Analysis of lipoprotein profiles and HDL function via Pearson product moment correlation analysis following exercise (2h and 24h) demonstrated significant relationship between HDL function and HDL-c (POST 2h: $r = 0.90$, $p = 0.02$; POST 24h: $r = 0.85$, $p = 0.03$) and HDL particle concentration ($r = 0.89$, $p = 0.02$; $r= 0.89$, $p = 0.02$).

Conclusion: In agreement with chronic aerobic exercise training studies, pilot analysis indicates that intensity of acute exercise is a considerable variable in assessing HDL function. Acute exercise exerts temporal modifications on HDL function and these changes are related to lipoproteins, but larger studies are needed to address the effect of acute exercise differing in intensity and duration.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCE

Metabolomic biomarkers of optimal dietary patterns in the Jackson Heart Study

Background: Diet quality plays an important role in chronic disease prevention. However, the underlying biological pathways influenced by dietary intake are not well understood. In this analysis, we hypothesize that we can identify a set of metabolomic biomarkers that reflect dietary pattern quality scores [Dietary Approaches to Stop Hypertension (DASH) and the Alternative Healthy Eating Index-2010 (AHEI-2010)] and point to biological pathways that may be involved in their health effects.

Methods: Analyses were conducted on 2,420 African American men and women from the Jackson Heart Study (JHS), a prospective population-based cohort study investigating risk factors for cardiovascular disease. Dietary pattern indices were derived using dietary intake data collected from food frequency questionnaires and metabolomic profiling was performed using liquid chromatography-tandem mass spectrometry at the baseline visit. We used multivariable-adjusted linear regression models to evaluate the association of each metabolite with the AHEI-2010 and DASH dietary pattern scores. We then applied elastic net regression analysis to derive metabolic biomarker signatures for each dietary pattern.

Results: The JHS analytic sample, aged 21-93 years, had a mean (SD) BMI 31.8 (7.1) kg/m^2 and included 63% female participants. Among the 321 metabolites analyzed, 92 were significantly associated with at least one dietary pattern (63 with AHEI; 69 with DASH; all false discovery rate < 0.05). Elastic net regression analysis revealed a metabolic signature comprised of 41 and 46 metabolites associated with the AHEI and DASH dietary pattern, respectively.

Conclusion: This study identified metabolomic biomarkers associated with healthy dietary patterns. An ongoing analysis will determine if our findings are replicated in other independent populations.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCES

State laws that expand water access are less common and less opposed than state laws that restrict sugar sweetened beverages in the United States

Purpose: Lowering sugar-sweetened beverage (SSB) intake is a public health goal that remains elusive. Roughly three-quarters of children and adults in the United States drink SSBs on a given day. Interventions designed to increase water access, such as installing drinking water fountains or providing water filters, have shown promise in lowering SSB intakes. Therefore, policies that improve access to safe drinking water may support SSB reduction. Nonetheless, comparisons of the frequency of state policies that increase water access have not been compared to policies that restrict SSBs.

Methods: We used a publicly available dataset from the US Centers for Disease Control and Prevention (CDC) on obesity legislation in the US between 2001 and 2017 to investigate the frequency and status of bills designed to improve water access compared with bills designed to restrict SSB access.

Results: Across the 17-year study period, 38 states and the District of Columbia enacted a total of 98 bills to increase access to drinking water and/or limit access to SSBs. Forty-nine bills restricted SSBs, 38 expanded water access, and 11 addressed both efforts within a single bill. Twelve states did not pass any bills to improve access to drinking water or to decrease access to SSBs. Of 207 dead bills that were either not voted on favorably or not selected for reading over the study period, nearly three quarters (n=150) were solely dedicated to SSB restriction. The ratio of enacted-to-dead bills was roughly one to one for increasing water access (37:38), compared with one to three for restricting SD access (49:150). Furthermore, the only two bills that were vetoed were designed to restrict access to SDs.

Conclusion: Although efforts to legislate SSB restriction were more common than those to expand water access, water access bills were met with less opposition. Policy efforts to increase drinking water access offer considerable promise in conjunction with ongoing policy efforts to restrict SSB intake.

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EXERCISE AND NUTRITION SCIENCES

Intergenerational Transmission of Low-calorie Sweeteners in Breast Milk

Background: Low-calorie sweeteners (LCS), such as sucralose and acesulfame-potassium (ace-K) are used as replacements for added sugars because they provide sweetness without calories. In the United States, 44% of lactating women consume beverages with LCS; yet the extent to which LCS are transmitted to infants via breast milk and the effects of early life LCS exposure on infants' future diet, weight, and health are not well understood. Therefore, the objective of this study is to measure the concentration of sucralose and ace-K that reaches breast milk and maternal plasma at pre-specified, serial, timepoints for 72 hours, as well as infants' plasma.

Methods: Exclusively breastfeeding mothers (n=22) were asked to avoid LCS and record their dietary intake one week prior to an in-person study visit. A blood and breast milk sample were collected from mothers at the start of the visit; after which, mothers drank 20 ounces of diet cranberry juice, sweetened with sucralose and ace-K. Maternal plasma and breast milk samples were collected at standardized timepoints for 12 hours after diet beverage ingestion. One blood sample was also collected from the infant. The timing of the infant plasma sample collection was determined through a population pharmacokinetic modeling approach designed to capture the entire time-course of both sweeteners following maternal ingestion of the diet beverage. Mothers returned for follow-up visits on three consecutive days for additional breast milk and blood sample collections.

Results: Ace-K rapidly transferred into breast milk with an average peak concentration of 399.49 ng/ml measured within 4 hours of diet beverage ingestion. Sucralose appeared in breast milk 1-2 hours after diet beverage ingestion with a mean peak concentration (7.02 ng/ml) detected 6-8 hours post-ingestion. Ace-K was detected in all infants' plasma with an average peak concentration of 10.02 ng/ml approximately 5.5 hours after maternal ingestion of the diet beverage; however, sucralose was detected in only ten infants' plasma approximately 6 hours post-maternal ingestion with a mean peak concentration of 3.20 ng/ml.

Conclusions: Ace-K rapidly transfers from mothers' breast milk into infants' circulation; yet sucralose was detected in the circulation of some but not all infants. Validation of the present findings with a larger sample is needed along with further investigation of potential effects of LCS exposure via breast milk on infants' taste preferences, appetite, gut microbiome composition, and cardiometabolic risk factors.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCES

The Association between Overall Cardiovascular Health Assessed by the Life's Essential 8 (LE8) metric and Dementia Among Community-Dwelling Men and Women in the InCHIANTI Study of Aging

Background: By 2030, 1 in 6 people will be aged 60 years or over, and there will be 1.4 billion older adults worldwide. With advancing age, dementia and cognitive decline are critical global public health concerns. Early prevention and management of these age-related conditions are essential to promote healthy aging since there are no effective treatments for dementia.

Methods: Secondary data analysis using longitudinal data collected from 928 InCHIANTI study participants (55% female) aged 65 years and older without dementia at baseline and 5 follow-up visits was conducted. Overall cardiovascular health (CVH) was assessed by the American Heart Association's LE8 metric which includes health behaviors (diet, physical activity, smoking status, sleep duration) and health factors (body mass index, blood lipid, blood glucose, blood pressure). The LE8 score ranged from 0-100 and was categorized as "low CVH" (0-49), "moderate CVH" (50-79), and "high CVH" (80-100). For the purposes of these analyses, based on the data distribution, we collapsed the categories as "low CVH" and "moderate & high CVH." Dementia was ascertained by a combination of neuropsychological testing and clinical assessment at each follow-up visit. Cox proportional hazards models were used to examine associations between overall CVH at baseline and incident dementia after a median follow-up of 14 years.

Results: Better overall cardiovascular health (moderate/high CVH) was inversely associated with the risk of incident dementia (Hazard Ratio (HR): 0.84, 95% confidence interval (CI): 0.75, 0.96, $p<0.008$). Compared to health factors, higher scores for the health behaviors, specifically weekly moderate-to-vigorous physical activity time, were significantly associated with a lower risk of dementia (health behaviors: HR:0.84, CI:0.73-0.96, $p=0.01$; physical activity: HR: 0.62, CI: 0.53,0.72, $p<0.001$).

Conclusion: Among older adults, better overall cardiovascular health assessed by the American Heart Association's Life's Essential 8 metric was protectively associated with the risk of incident dementia.

Implications: A metric that includes health factors and behaviors was associated with dementia risk. Adopting a healthy lifestyle, including physical activity, may serve as an intervention strategy for dementia prevention.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCES

Behavioral Patterns of Sugary Drink Consumption Among African American Adolescents: An Ecological Momentary Assessment Study

Background

Sugary drinks (SDs) are the predominant contributors to added sugar intake among adolescents, with the highest intakes reported among adolescents from minority backgrounds. The objective of this pilot study was to investigate, in real-time, behavioral patterns of SD consumption among African American adolescents from low-income households, using real-time, ecological momentary assessment (EMA).

Methods

African American adolescents (n=39, age 12-17 years) attended a virtual study meeting involving completion of surveys and training on responding to EMA prompts using a mobile phone application. On the seven subsequent days, adolescents were instructed to respond to researcher-initiated prompts three times daily, which queried their SD intake, location, social context, activities, stress, and mood. They were also asked to complete an analogous self-initiated survey each time they consumed SDs.

Results

SD consumption was reported on 219 of 582 (38%) of researcher-initiated surveys and on 135 self-initiated SD consumption surveys, for a total of 354 instances of SD intake over the 7-day assessment period. The majority (69%) of the surveys were completed while at home. SD consumption was reported on 37%, 35%, and 41% of researcher-initiated surveys completed at their home, at the home of a friend or family member, or while in transit, respectively. Odds of SD consumption were similar regardless of adolescents' location, social context, and activities. While no differences in stress, positive affect, or negative affect were reported based on whether the adolescent was consuming a SD, adolescents reported higher positive affect after compared with before SD intake ($p < 0.01$) on instances where a SD was consumed.

Conclusions

Use of real-time EMA demonstrated that SDs were frequently consumed, regardless of adolescents' location, social context, or activities. These data support the promise of EMA among African American youth from low-income households and underscore the need to develop multi-level interventions targeting multiple settings and contexts to effectively lower adolescents' SD intake.

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EXERCISE AND NUTRITION SCIENCES

Effect of nutrition interventions with mental health components on the nutrition status in adolescents: A systematic review

Background Mental health and nutrition are interconnected components of overall health. While nutrition interventions aim at improving the nutrition status of adolescents, the inclusion of mental health components in interventions has been limited. Furthermore, no systematic reviews have been conducted on this topic. The study objective is to conduct a systematic review of the literature on the effectiveness of nutrition interventions with mental health components on the nutrition knowledge and diet quality of adolescents.

Methods We searched the PubMed, Scopus, CINAHL, PsycINFO, and CENTRAL databases up to April 25th, 2022. Eligible intervention studies included nutrition intervention with mental health components in adolescents aged 10 to 19 and an assessment of nutrition knowledge or diet quality changes. The risk of bias was assessed by the Cochrane risk-of-bias 2 tool for randomized trials and cluster randomized trials and the ROBINS-I tool for non-randomized controlled trials depending on the study design. The systematic review protocol was registered in PROSPERO.

Results We identified 19 eligible studies, including 9 randomized controlled trials, 4 non-randomized controlled trials, and 6 trials. Changes in dietary intakes were assessed in 16 studies, changes in nutrition knowledge in 2 studies, and both changes in dietary patterns and nutrition knowledge in 1 study. Studies found an increase in the consumption of fruits and vegetables (n=4), and healthier dietary patterns (n=3), a decrease in fast- or junk-foods (n=3), sweets (n=1), sugar-sweetened beverages (SSB) (n=2), snacking (n=2), total calories (n=1), whereas others found no changes for the consumption of fruits and vegetables (n=3), fast- or junk-foods (n=1), SSB (n=1), or total calories (n=3). Significant improvements in emotional or restrained eating behaviors were observed in 2 studies, but not in 2 other studies. Improvement in nutrition knowledge was found in all studies with this outcome. Furthermore, in two trials, the only difference between the intervention and the control group was the addition of mental health components, which resulted in a significantly greater improvement in nutrition knowledge and a reduction in SSB and total energy intake.

Conclusions There is some evidence for the beneficial effects of adolescent nutrition interventions with mental health components on nutrition knowledge and diet quality; however, the strength of the evidence is limited by the heterogeneity of study designs and outcomes. The results show a potential for further research with more homogenous study designs and measurement tools.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCES

Participant Perspectives on the Impact of a School-Based, Experiential Food Education Program across Childhood, Adolescence, and Young Adulthood

Background: School-based experiential food education programs are an increasingly common strategy to promote fruit and vegetable (FV) intake among children and shape dietary habits that persist into adulthood. Evidence points to modest program influence on children's FV intake in the short-term, but little is known about the enduring impact of these programs on dietary intake through childhood and into young adulthood. To address the knowledge gap regarding how the impact of these programs may evolve over time, we sought to understand the experiences of current and alumni participants of an experiential food education program. Specifically, we sought to identify common themes of program impact across current participants and alumni and explore how themes may expand as alumni move adolescence and into adulthood.

Methods: We used an instrumental case study approach, with the program serving as the unit of case analysis, illustrating the experience of participation in a comprehensive food education program over multiple years. We conducted semi-structured focus groups with current elementary students and alumni participants now in secondary school or university, recruited through purposive and network sampling. Focus groups were audio-recorded, transcribed verbatim, manually coded, iteratively analyzed, and distilled into nine emergent themes supported by analysis of class observations, informal interviews with program staff, and field notes.

Results: Nine focus groups were held with n=39 current participants (9.6 ± 1.1 years, 41% female) and n=39 program alumni (14.4 ± 2.5 years, 56% female) from urban settings. Participants had 6-8 years of program exposure, and alumni were an average of 4 years removed from the program. Nine emergent themes were categorized into three levels of program impact: immediate, beyond the classroom, and sustained. Immediate program impact was characterized by *enjoyment, hands-on learning,* and *fostering connection.* Beyond the classroom, program participation led to *shifts in individual and family food intake, involvement in household food practices,* and *desire for fresh food options at school.* Among alumni participants, sustained impact included *appreciation for fresh food, openness to trying new foods,* and *confidence to make informed food choices.*

Conclusion: This research provides deeper understanding of participant experience with an experiential food education program, program influence on food-related decisions, and how this influence evolved as program alumni grew older. This increased understanding can in turn shape policy and practice aimed at improving youth diet quality and increase their likelihood of experiencing lifelong better health outcomes and quality of life.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCES

Development of a primary-care and social-marketing based sugary drink reduction intervention: Qualitative feedback from community pediatricians

Background: Sugary drinks (SD) are the primary source of added sugar in children's diets, with higher intakes reported in children from low-income and/or minority backgrounds. In particular, non-Hispanic Black children are disproportionately exposed to targeted SD advertising and experience greater difficulty reducing their SD intake due to a variety of psychosocial and economic factors. Previous SD reduction efforts have underutilized the primary care setting as an opportunity for whole-family engagement. This study aims to evaluate pediatricians' perceptions of the feasibility, acceptability, and sustainability of an innovative, primary-care and social marketing-based intervention designed to reduce sugary drink (SD) intake among Black youth (11-14 years old) in Washington D.C.

Methods: In-depth qualitative interviews were conducted with providers (n=6) at a pediatric primary care clinic in an underserved area of Washington D.C. using a semi-structured interview guide. Pediatricians provided feedback on the proposed intervention model, specifically regarding 1) willingness of pediatricians and the clinic's patient population to engage with the intervention; 2) familiarity with and attitudes towards behavior change counseling; 3) intervention feasibility, acceptability, and sustainability; and 4) suggestions for intervention content and delivery. Interviews were recorded, transcribed, and coded by a trained research assistant, after which emergent themes and subthemes were identified.

Results: Four overarching themes were: 1) key facilitators of intervention success, including familiarity and sustainability of SD reduction counseling, an impressionable target age group, and multi-generational approach; 2) key barriers to intervention success, such as limited appointment time, need for outside support to maintain social media messaging, and perceived hesitancy from families to change; 3) strategies to promote participant engagement, such as incentives, community champions, and popular social media platforms to deliver current and engaging materials; and 4) suggestions for intervention content such as safety of tap water and health risks associated with SD intake.

Conclusions: Results demonstrate that pediatricians are enthusiastic about the intervention and view SD reduction counseling as feasible, acceptable, and sustainable in the primary care setting. The use of popular social media platforms was viewed as a key strength of the intervention despite some concerns about sustainability. Development of concise, culturally relevant intervention materials is in progress and content will continue to be refined through additional interviews with members of the target population and their parents.

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GWSPH RESEARCH SHOWCASE

EXERCISE AND NUTRITION SCIENCES

The Impact of a University Dining Hall on Fruit and Vegetable Consumption Among First-Year Undergraduate Students

Background: The diet of Americans does not align with the Dietary Guidelines for Americans, with most Americans consuming excessive amounts of saturated fat, added sugar, and sodium and inadequate amounts of fruits and vegetables. Total fruit and vegetable intakes are particularly low among young adults aged 18-24. Young adulthood is a unique life stage characterized by increased autonomy and development of eating patterns which last into adulthood. Many young adults are also college students who face competing demands including academics and work and must also decide what to eat. The university food environment therefore plays an important role in college students' diets.

Purpose: To evaluate the impact of Thurston Dining Hall, newly opened in fall 2022, on fruit and vegetable consumption among first-year undergraduate students at The George Washington University (GWU).

Methods: Convenience sampling was used to recruit 128 participants. For eligibility, participants were first-year undergraduate students at GWU who had already eaten dinner (defined as 4PM-8PM in this study) at the time of data collection. After providing informed consent, students completed a demographic questionnaire and an interviewer-administered single meal recall using the USDA Automated Multiple Pass Method and the hands portions method for serving sizes. Data were entered into Nutrition Data System for Research (NDSR) and analyzed using SPSS Statistics.

Results: A total of 114 participants were included for analysis: 13 participants were excluded for eating at a secondary dining hall on campus, and 1 participant was excluded for eating outside dinner hours. The average age was 18.5 ± 0.63 years. Students were mostly female (56.1%), white (70.2%), and not Hispanic or Latino (82.3%). Students who ate at the dining hall consumed on average one additional full serving of fruits and vegetables compared to those did not eat at the dining hall (2.7 ± 2.1 and 1.7± 1.3 respectively, p=0.009) during their dinner meal. Total vegetable intake excluding vegetable juice, potatoes, and other starchy vegetables was on average 0.8 servings greater among the dining hall group (2.7 ± 2.1 in the dining hall and 1.7± 1.3 in the non-dining hall group; p=0.007). Fruit consumption was not associated with eating dinner at the dining hall.

Conclusions: An all-you-care-to-eat style dining hall as part of the university food environment can support improved diet quality among college students. Further research should assess the impact of the dining hall on other dietary components beyond fruit and vegetable intake at various meals.

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GWSPH RESEARCH SHOWCASE

EXERCISE PHYSIOLOGY AND APPLIED NUTRITION

Differences in pretreatment blood counts but not incidence of hematologic toxicity in black and non-black women receiving chemotherapy for breast cancer

Background: Black women have significantly higher breast cancer mortality rates compared to non-Black women. Reasons for this disparity are unclear, but differences in the relative dose intensity of chemotherapy received may be a contributing factor. Because hematologic toxicity is a common reason for treatment delays and discontinuation, the objective of this study was to compare pretreatment blood counts and incidence of hematologic toxicity between Black and non-Black women receiving chemotherapy for treatment of breast cancer.

Methods: Women with a diagnosis of lymph node positive, invasive breast cancer who received either neoadjuvant or adjuvant chemotherapy with anthracycline- and/or taxane-containing regimens between 2012-2019 and had a staging CT within 12 weeks of chemotherapy initiation were included in this retrospective study. Data on age, race, cancer staging at diagnosis, comorbidities, height and weight, chemotherapy regimen and dose, and use of supportive care medications, including hematopoietic colony stimulating factors (CSFs), were abstracted from the electronic health record. Complete blood counts and comprehensive metabolic laboratory panels were obtained from the most proximal blood draw preceding day 1 of each chemotherapy cycle through 30 days after the final cycle. Incidence of grade 3 or higher toxicity (yes/no) was determined using the Common Toxicity Criteria for Adverse Events (version 5.0). Linear regression analyses were used to test for differences in baseline blood counts between Black and non-Black women, and Fisher's Exact Test was used to test for differences in incidence of hematologic toxicity stratified by chemotherapy regimen.

Results: Black women in the study cohort (n=146) were older (mean: 53.0 vs 49.2 years) and had higher body mass index (BMI, mean: 31.7 vs. 26.5 kg/m^2) at baseline compared to non-Black women (n=111). Pre-chemotherapy mean hemoglobin (12.3 vs, 13.1 g/dL, $p<0.01$), hematocrit (37.9 vs. 39.3%, $p<0.01$), white blood cell counts (6.8 vs, 7.5/uL, $p=0.02$) and neutrophil counts (4.1 vs 5.2/uL $p<0.01$) were statistically significantly lower in Black women compared to non-Black women after adjustment for BMI. There were no significant differences in baseline red blood cell or platelet counts. Most women (91%) received CSF at some point during chemotherapy. No statistically significant differences in incidence of grade 3 or higher hematologic toxicity were observed between Black and non-Black women.

Conclusions: Although baseline hemoglobin, hematocrit, white blood cell and neutrophil counts were lower among Black compared to non-Black women, no differences in the incidence of grade 3 or higher hematologic toxicity were observed during chemotherapy.

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Global Health

Characterizing the implementation of performance management interventions in a primary health care system: a case study of the Salud Mesoamerica Initiative in El Salvador

Background: Performance management (PM) reforms have been introduced in health systems worldwide to improve accountability, transparency and learning. However, gaps in evidence exist regarding the ways in which PM contributes to organizational-level outcomes. Between 2015 and 2017, the government of El Salvador and the Salud Mesoamerica Initiative (SMI) introduced team-based PM interventions in the country's primary health care (PHC) system including target setting, performance measurement, provision of feedback and in-kind incentives. The program's evaluation showed widespread improvements in performance for community outreach and service timeliness, quality and utilization. The current study characterizes how the implementation of team-based PM interventions by SMI implementers contributed to PHC system performance improvements.

Methods: We used a descriptive, single-case study design informed by a program theory (PT). Data sources included qualitative in-depth interviews and SMI program documents. We interviewed the members of four PHC teams (n = 13), Ministry of Health (MOH) decision makers (n = 8) and SMI officials (n = 6). Coded data were summarized, and thematic analysis was employed to identify broader categories and patterns.

Results: The outcomes chain in the PT was refined based on empirical findings that revealed the convergence of two processes: (1) increased social interactions and relationships among implementers that enhanced communication and created opportunities for social learning and (2) cyclical performance monitoring that generated novel flows of information. These processes contributed to emergent outcomes including the uptake of performance information, altruistic behaviors in service delivery and organizational learning. Through time, the cyclical nature of PM appears to have led to the spread of these behaviors beyond the teams studied here, thus contributing to system-wide effects.

Conclusion: Findings illustrate the social nature of implementation processes and describe plausible pathways through which lower-order implementation program effects can contribute to higher-order changes in system performance.

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GWSPH RESEARCH SHOWCASE

GLOBAL HEALTH

The influence of contextual factors on primary healthcare system performance improvement: A theory-driven case study of the Salud Mesoamerica Initiative in El Salvador

Background: Context in health policy and systems research is frequently framed as a backdrop for the delivery of program interventions or is reduced to 'barriers and facilitators' for implementation. In this research, context refers to the complex, dynamic, and relational settings in which interventions are implemented as well as to the external environment or infrastructure affecting program delivery. Here, we present the results of a study of the implementation context in which performance management (PM) interventions were delivered in El Salvador between 2015-2017 by the Salud Mesoamerica Initiative (SMI).

Methods: Single-case study informed by a program theory. Data collected included in-depth interviews and program documents. We purposively sampled and interviewed 27 respondents including the team members of four primary health care (PHC) teams, decisionmakers from the Ministry of Health, and SMI officials. In coding the data, we used domains from the Consolidated Framework for Implementation Research. We identified broader patterns and emergent themes through iterative thematic analysis.

Results: We identified the mainly positive influence exercised by system antecedents and initial conditions for widespread improvement in the performance of El Salvador's PHC system. Favorable initial conditions were exemplified by the introduction of comprehensive PHC as the key feature of a health reform introduced by the government two years before the initiation of SMI. SMI's focus on improving community health among the poorest was widely perceived as compatible with the government's own aims. During early implementation, SMI and the Ministry of Health established spaces for dialogue, co-creation, and consensus-building. These spaces contributed to quality communications and the emergence of trust. These, in turn, contributed to increased ownership of the program by the government and to the purposive dissemination of new knowledge, tools, and practices.

Conclusion: Our study illustrates how defining context as individual, interpersonal, and institutional settings can improve the depth of accounts of the influence of complex, multi-faceted interventions on population health. This approach can generate explanations that are richer than the more frequently used approaches that treat context as a backdrop for an external intervention or that simplifies it as barriers and facilitators.

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The Structure of Corporate Permeation: An Examination of a Potential Tool for Measuring Commercial Determinants of Health

Background: Commercial Determinants of Health (CDoH) is an emerging field within public health that looks at the role played by commercial actors on health, most commonly in the production and marketing of unhealthy commodities, which are the known causes of noncommunicable diseases, and the shaping of the social, political, and economic environments in which these products exist and influence health. Attempts to measure the CDoH are nascent within the field, and while additional research is needed to develop these tools, an examination of existing tools can also help strengthen their application and the overall understanding of CDoH. The Corporate Permeation Index (CPI) is one such tool, a composite index of 25 indicators with data collected in 148 countries from 2010-2015, based on Lima and Galea's Vehicles of Corporate Power Framework.

Purpose: This research sought to better understand the underlying theoretical framework of the concept of corporate permeation, thereby improving the use of the CPI in research and advocacy.

Methods: We developed seven conceptual models of corporate permeation by drawing upon existing literature and tested them for model fit against the CPI dataset and configural invariance across multiple years using MPlus with a full-information maximum likelihood estimator. The seven conceptual models were as follows: a one factor model, Lima and Galea's Vehicles of Corporate Power, Lima and Galea's CPI structure, and a six-factor interpretation. A small number of cross loadings were included between factors in three of the models, given the high correlation between many of the indicators.

Results: None of the seven conceptual models of corporate permeation met standards for configural invariance, although a six-factor interpretation, with factors Legal Environment, Firms' Commercial Behavior, Preference Shaping, Trade Conditions, Foreign Investment and Influence, and the Extra-Legal Environment, reached the acceptable SRMR goodness-of-fit threshold and offers an improvement in conceptualizing corporate permeation over existing frameworks.

Conclusion: These findings indicate the need for further development of theoretical frameworks to better understand the concept of corporate permeation in order to provide further insight into the utility of the CPI and its role in measuring the CDoH. Continued efforts to develop and assess frameworks and metrics of CDoH are critically important as the influence of corporations on health becomes more widely understood.

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GWSPH RESEARCH SHOWCASE

GLOBAL HEALTH

Developing a small animal model to evaluate and optimize vaccine targeting transmission of human malaria caused by *Plasmodium vivax*

Background: Transmission blocking vaccines (TBV) targeting transmission of malaria represent an ideal public health tool to eliminate malaria at the population level. Malaria caused by *Plasmodium falciparum* and *P. vivax* account for >90% global malaria burden. There is no suitable animal model for species of *Plasmodium,* however availability of an in vitro culture system for *P. falciparum* has facilitated the development of an assay know as standard membrane feeding assay (SMFA), to assess efficacy of TBVs of *P. falciparum*. It is still not possible to maintain *P. vivax* in culture, and similar *P. vivax* TBV development has lagged due to highly unpredictable and unreliable access to *P. vivax* parasites from infected people in endemic areas. We have focused our efforts to overcome this challenge and we have recently succeeded in developing a mouse malaria model to evaluate TBVs aimed at blocking transmission of *P. vivax.*

Methods: We first developed a genetically modified mouse malaria parasite *P. berghei* (TgPbvs25) expressing *P. vivax* TBV antigen known as Pvs25. Mice infected with TgPbvs25 successfully transmitted malaria parasites to *Anopheles stephensi* mosquitoes during ingestion of blood, and transmission was effectively blocked when mice were immunized with a DNA vaccine based on Pvs25. Next, we went on to establish experimental conditions, including time, temperature and dilution factors etc, necessary for maintaining in vitro infectivity of *P. berghei* parasites and thus allowing us to develop first ever SMFA to directly facilitate evaluation and optimization of TBVs aimed at targeting transmission of human malaria caused by *P. vivax.*

Results: We successfully developed a transgenic *P. berghei* parasite expressing Pvs25. This transgenic parasite remained competent in malaria transmission and its infectivity to mosquitoes was effectively reduced by antibodies induced by a Pvs25 DNA vaccine. Further extension of this work allowed us to develop first ever ex vivo SMFA to permit screening, evaluation and optimization of Pvs25-based *P. vivax* TBVs without having to rely on unpredictable and irreproducible source of blood from patients infected with *P. vivax.* Indeed, we demonstrated >95% transmission reducing activity of monoclonal antibodies and Pvs25 vaccine-immunized antibodies when tested in SMFA using blood from mice infected with the transgenic parasite developed in this study.

Conclusion: A reliable SMFA method using a transgenic *P. berghei* parasite for evaluating vaccines targeting transmission of human malaria parasite *P. vivax* was developed. This method is expected to expedite the development of *P. vivax* TBVs based on Pvs25 antigen.

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GWSPH RESEARCH SHOWCASE

DEPARTMENT OF GLOBAL HEALTH

Immunization Policy in Latin America: The Influence of NITAGs on DTP Vaccine Uptake

Between 2015 and 2020, overall vaccination against diphtheria, tetanus, and pertussis (DTP) decreased from 90% to 76% across countries and territories in Latin America. To better evaluate this effect at the country-level, National Immunization Technical Advisory Groups (NITAGs) will be assessed given their role in soliciting recommendations that guide evidence-based decision-making for in-country immunization programs. Their effectiveness may be estimated through changes in country-level programs, including changes in vaccination coverage after establishing a NITAG. Given the recent decline in coverage and the use of DTP vaccination as a common indicator of health program performance, this vaccine has been used as a measure of the effectiveness of NITAGs.

This project estimates time-series panel models of DTP vaccine coverage before and after implementation of NITAGs with country-level fixed effects. It controls for secular changes over time and includes a model to estimate effects of time (measured as decades) on the association between DTP coverage and a country's implementation of a NITAG. The analytic sample includes 31 countries and territories with data between 1980-2019. Key findings indicate that having an established NITAG results in about 5% greater DTP vaccine coverage when accounting for time, and that the greatest proportion of the variance in DTP vaccine coverage may be attributed to a country's fixed effect. Data from this linear regression suggest that NITAGs have an influential capacity in the establishment and improvement of policies related to DTP vaccine uptake in Latin America. These findings justify the technical role of NITAGs and may be used to recommend mandatory DTP-containing vaccinations to countries and territories without them across the Americas.

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The "Republic of NGOs": a Scoping Review of Mental Health Care Infrastructure and Foreign Assistance in Haiti After the 2010 Earthquake

Background: Haiti receives more aid per capita than any other nation according to the World Bank, with nongovernmental organizations (NGOs) accounting for as much as a quarter of Haiti's gross domestic product. After the 2010 earthquake in Haiti that impacted more than 3 million Haitians, this aid only augmented, with billions invested in development worldwide. Despite these investments, however, Haiti remains the poorest country in the Latin American and Caribbean region with a large mental health treatment gap. This scoping literature review examines the mental health infrastructure that existed before, during, and after the 2010 earthquake to examine how crises spur international action, and whether that action is sustainable and effective.

Methods: Searching Google Scholar, newspapers from around the globe, and other databases including *ProQuest Global Newsstream*, *Nexis Uni,* and the *NewsBank Access World News Research Collection*, I compiled literature that is relevant to mental health infrastructure and provision of care in Haiti. I also consulted those who worked for the organizations Partners in Health and Zanmi Lasante that provided public healthcare in Haiti before, during, and after the 2010 earthquake.

Results: Examples of global reactions to the earthquake were the International Monetary Fund cancelling $286 million USD in debt, and NGOs and humanitarian workers raising $3 billion within one year of the quake, 40,000 people to received psychological first aid. Despite these efforts, ten years later the rate of mental health remains under 1.5 per 100,000 population, only one more public hospital specializing in mental health care has been created, and the national budget allocates less than 2% to mental health and has lowered its overall public health budget to less than 5% to reflect donations, even though donations have been steadily declining for the past decade. The pledged reconstruction efforts have also fallen short by more than 80% in some cases, and many foreign organizations providing aid abandoned their initiatives. Some organizations, like Zanmi Lasante and Partners in Health, however, have committed themselves to reforming the mental healthcare system in Haiti.

Conclusion: The 2010 Haitian earthquake is a key case study as it shows the power that crises have in spurring action and billions in donations. The earthquake response highlights these positive representations of those committed to humanitarianism, but it also highlights the ways in which efforts, if not done in coordinated, culturally appropriate ways, can result in loss of funds, little change, and continuous suffering.

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GWSPH RESEARCH SHOWCASE

GLOBAL HEALTH

Risk of Adverse Maternal and Fetal Outcomes Associated with COVID-19 Variants of Concern: A Sequential Prospective Meta-Analysis

Introduction We conducted an individual patient data meta-analysis with collaborators from various countries to identify SARS-CoV-2 variants of concern associated with adverse maternal and neonatal outcomes.

Methods Eligible studies included registries and cohort studies that recruited pregnant and recently postpartum women with confirmed COVID-19. We invited investigators already participating in ongoing sequential, prospective meta-analyses of perinatal COVID-19 to share individual patient data (IPD) with our team for review and analysis. We examined 31 outcomes related to: COVID-19 severity (n=5); maternal morbidities including adverse birth outcomes (n=14); fetal and neonatal morbidity and mortality (n=5); and adverse birth outcomes (n=8). SARS-CoV-2 strains identified as variants of concern by the WHO were analyzed using the publicly available strain frequency data by Nextstrain.org; strains were classified as dominant when comprising more than half of sequences in a given geographic area. We applied a 2-stage IPD meta-analytic framework to generate pooled relative risks, with 95% CI for each dominant variant/outcome pair when there were one or more studies with available data.

Results The Delta wave, compared to Omicron, was associated with a higher risk of all adverse COVID-19 severity outcomes in pregnancy including risk of hospitalization [RR 4.02 (95% CI 1.10, 14.69), n=1 study], ICU admission [RR 2.59 (95% CI 1.26, 5.30, n=3 studies], critical care admission [RR 2.52 (95% CI 1.25, 5.08, n=3 studies], needing ventilation [RR 3.96 (95% CI 1.47, 10.71), n=3 studies] and pneumonia [RR 6.73 (95% CI 2.17, 20.90), n=3 studies]. Most maternal morbidity and mortality indicators were not at increased risk during any of the COVID-19 variant waves except hemorrhage, any Cesarean section, intrapartum Cesarean section and maternal composite outcome, although data was limited. Fetal and neonatal morbidity and mortality did not show significant increases in risks during any of the COVID-19 waves except stillbirth and perinatal death during the Delta wave ([RR 4.84 (95% CI 1.37, 17.05, n=3 studies], [RR 6.03 (95% CI 1.63, 22.34), n=3 studies], respectively) when compared to the Pre-alpha wave. Adverse birth outcomes including very low birthweight and very preterm birth also showed increased risks during the Delta wave compared to the Pre-alpha wave.

Conclusion During periods of Delta strain predominance, all COVID-19 severity outcomes were more severe among pregnant women, compared to periods when other COVID-19 strains predominated. In addition, there are limited data comparing the impact of different variants on pregnancy outcomes. This highlights the importance of ongoing genomic surveillance among special populations.

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GWSPH RESEARCH SHOWCASE

GLOBAL HEALTH PROGRAM DESIGN, MONITORING & EVALUATION

Connecting the Dots: Sexual and Reproductive Health and Rights as Prerequisites for Global Gender Equality and Empowerment Policy and Programming

Background: Women and girls' health, freedom from violence, and equal participation in education, the workforce, and politics are critical components to achieving gender equality and empowerment globally. Consequently, these issues are directly impacted by the availability and accessibility of comprehensive sexual and reproductive health and rights (SRHR). By fully investing in the global SRHR agenda, the human rights of women and girls can be more fully realized. A reluctance to fully support comprehensive SRHR policy and programs prevents the U.S. government from properly addressing global issues that are widely considered critical across political affiliations. This presentation examines how gender policy goals are inextricably intertwined with SRHR. Channeling funding to efforts to improve women's empowerment without connecting the dots between women's access to SRHR and their subsequent ability to participate in education, the workforce, and political decision-making will inevitably undermine these efforts.

Methods: This evidence-based analysis began in July 2021 and is informed by data from various sources, including several United Nations organizations, Guttmacher Institute, and articles from peer-reviewed journals. Data from the Congressional Research Service regarding U.S. budgets are used to highlight U.S. government spending patterns for international family planning/reproductive health (FP/RH) programming over the past 10 years, and analysis of federal legislation is used to explain the connection between SRHR and gender equality priorities.

Results: This analysis highlights the global status of SRHR core components; demonstrates SRHR as a prerequisite for achieving other priority goals; emphasizes the funding and political will needed to achieve global SRHR; and stresses why it is critical to renew efforts now. The U.S. should increase its support FP/RH programming from $607.5 million to $1.74 billion annually; however, current FP/RH programming is not inclusive of the entire SRHR agenda and further funding is needed to ensure all SRHR components are realized. Expanding the reach of FP/RH programming must include components of the SRHR agenda currently left out, such as abortion care and infertility treatment. For that to happen, the U.S. must change policy, including passage of the *Global HER Act*, permanently repealing the Global Gag Rule; passage of the *Abortion is Health Care Everywhere Act*, repealing the Helms Amendment; and modifying the Kemp-Kasten Amendment, ensuring U.S. funds are not wrongfully withheld from UNFPA.

Conclusion: The purpose of this research is to unequivocally identify the connection of SRHR to U.S. government global programing for women's empowerment and make the renewed case for investments in SRHR.

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GWSPH RESEARCH SHOWCASE

GLOBAL HEALTH

Making sense of global health equity frameworks

Background: Health equity frameworks are used as a guide by healthcare professionals, communities, and other stakeholders to shape policies and culture in society. As a result, these toolkits draw on evidence-based models that affect health. To identify its useful applications for determining health and develop a paradigm for global equality frameworks, this study aims to analyze, summarize, and synthesize health equity frameworks on all levels (local to international). Specific aims include determining frameworks that are actually equitable, such as having a visible chart rather than a theoretical one. Looking at the writers' origins, how many scholarly articles are there, and what common themes and patterns the authors are expressing regarding the frameworks. Other objectives include determining how many articles have imported frameworks and whether all framework contents discuss the same faucet of equity. The proposed health equity framework will then be used to inform countries' thinking regarding health equity globally.

Methods: Methods include undertaking a full text screening in a systematic review to identify conceptual frameworks, theories, and definitions to addressing health equity globally and then analyzing the current frameworks in use. Reviewers assessed whether the model was validated and if it was based on existing theory or empirical (yes/no/unclear/neither/not applicable). Articles that have empirical evidence or tests empirically were deemed to have good methodological quality. To identify high quality frameworks, further filtering of articles used definitions and determinants.

Results: A total of 1233 articles were retrieved from EMBASE and Medline. After completion of the title/abstract screenings and full text screenings we were able to narrow down to a total of 172 articles for mapping. 25 articles were selected after completion of the quality assessment, 5 of the articles being gray literature.

Conclusion: The feasibility and practicability of these frameworks influence their effectiveness in treating vulnerable populations. Investigated frameworks show that there is a significant gap in the amount of global south articles compared to global north, but the originality of frameworks is high quality. These themes could serve as a starting point for future work to operationalize what we provide as a unifying conceptual framework

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GWSPH RESEARCH SHOWCASE

GLOBAL HEALTH

Displacement, Economic Distress, and Violence Against Adolescents: Evidence from Rohingya Refugees in Cox's Bazar, Bangladesh

Background & Significance: The Rohingya community has faced extensive persecution as a refugee group, having experienced generations of conflict and violence through forced evacuation and ethnic cleansing in Myanmar. This study draws on data collected as a part of Gender and Adolescence: Global Evidence (GAGE) program to understand the link between economic distress, asset ownership and role of cash transfers with the incidence of GBV within the adolescent population in Cox's Bazar District.

Methods: This study uses quantitative data collected in the first round of the GAGE longitudinal study nested within the Cox's Bazar Panel Survey (CBPS). The project primarily focuses on a subsample of 394 male and 549 female (n = 943) Rohingya adolescents over age of 15 across both camp and host communities. We employ linear regression analysis to investigate the relationship between variables of interest.

Results: Additional units of assets are positively associated with a 3.5 percentage point increase in GBV within the neighborhood in camps ($p < 0.05$). On the contrary, having more assets at the time of survey relative to July 2017 is associated with experiencing 2.6 and 1.6 percentage points less violence within households for adolescents in host communities and camps. Receiving cash assistance is associated with a 2.7 percentage points increase in GBV for the host population and 28 percentage points ($p < 0.10$) increase for those residing in camps. Adolescents in camps who accepted cash assistance have an increased likelihood of experiencing GBV by 15.9 percentage points ($p < 0.01$). Receiving cash assistance is associated with 20.6 points ($p < 0.05$) decrease in violence households for adolescents in camps.

Conclusion & Significance: Efficiently addressing GBV in complex humanitarian settings requires a nuanced understanding of contextual dynamics and socioeconomic factors that shape risk. Economic distress could reinforce traditional gender roles, power imbalances and lead to jealousy and disempowerment within community. Cash assistance can reduce the risk of GBV but can't mitigate the underlying beliefs and norms that facilitate this practice. We need policy interventions to combine cash aid with GBV programming informed by social and gender analysis. More research is needed to better comprehend the mediating factors that influence the link between economic distress and GBV.

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An Analysis of Patterns of Police and Military Violence Perpetrated Against People on the Move in Southeastern Europe

Background: A recent influx of people on the move – including refugees, asylum seekers, and other migrants – through Southeastern Europe has been met with violence and denials of dignity by military and police forces. This research examines testimonies collected from people on the move by the Border Violence Monitoring Network (BVMN), a nonprofit network of organizations that tracks violent and illegal pushbacks across borders.

Methods: In this mixed-methods analysis, 638 testimonies were collected from BVMN's public, de-identified database for analysis. All testimonies spanning January 2017 to December 2021 that involved one or more minor were included. Testimonies were qualitatively coded to identify demographic characteristics of the people affected; characteristics of those perpetrating abuses; instances of violence; instances in which a person's dignity was denied via degradation, denial of basic needs, coerced payments, and other such activities; and subsequent physical and mental health effects resulting from pushbacks. STATA 17 and ArcGIS were used to analyze the patterns, pervasiveness, and severity of violence via a chi-squared analysis, a logistic regression analysis, and a series of geographic cluster analyses.

Results: 634 of the 638 testimonies (99.99%) mentioned an explicit instance of violence or a denial of dignity, with 504 testimonies (79%) containing a reference to one or more acts of violence committed against people on the move. Testimonies from Greece were found to have significantly higher odds (OR = 15.95, $p < 0.001$) of containing references to violence than testimonies from other countries in the dataset, and certain regions of the Greek-Turkish border, Croatian-Bosnian border, and Serbian-Romanian border were highlighted by the geographic analysis as areas of concern for highly concentrated violent incidents.

Conclusion: Abuses committed by police and military forces across Eastern Europe demonstrate a dangerous denial of the right to claim asylum and of the right to security of person, both of which are guaranteed to all through international law. The failure of the international community to establish effective mechanisms by which these protections may be monitored and enforced has damaged the health and dignity of people on the move in this region.

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GWSPH RESEARCH SHOWCASE

GLOBAL HEALTH

Redefining Maternal Anemia: Protocol for Establishing New Hemoglobin Cutoffs and Identifying Contributing factors During Pregnancy and Postpartum

Introduction:

Anemia affects over 613 million women of reproductive age worldwide and increases the risk of adverse maternal and neonatal health outcomes during pregnancy. To improve the diagnosis of anemia and anticipate negative outcomes, current research indicates an evidence gap within the hemoglobin thresholds for pregnant women. New hemoglobin cutoffs for maternal anemia are needed to diagnose anemia and predict related adverse events accurately.

Methods and Analysis:

Redefining Maternal Anemia in Pregnancy and Postpartum (ReMAPP) is a multisite, prospective, open cohort study nested within the ongoing Pregnancy Risk Stratification Innovation and Measurement Alliance Maternal and Newborn Health (PRiSMA MNH) study. Aim 3 of the ReMAPP study entails a cross-sectional, stratified sampling of women in the first, second, and third trimesters recruited from participants in the primary ReMAPP cohort. Aim 3 will describe underlying contributing factors for anemia for this sample of women in the sub-cohort from each trimester. The study will use multiple analytical approaches to establish new hemoglobin cutoffs for maternal anemia with a goal of outlining the fundamental factors contributing to anemia. Indicators to be assessed include those for iron status, inflammation, communicable diseases, hemoglobinopathies, micronutrient status, and non-communicable diseases. Thus, the study will assess the aforementioned potential contributing factors of anemia and compare the factors between anemic and nonanemic participants. The study will calculate the population attributable risk percent (PAR%) to identify salient determinants of maternal anemia.

Ethics and Dissemination:

The study has received local and national ethical approvals from all study countries. Findings from multisite analyses will be published in an open-access peer-reviewed journal and disseminated at national and international levels.

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GWSPH RESEARCH SHOWCASE

GLOBAL HEALTH

Perceptions and Factors Leading to Vaccine Hesitancy in Africa: A Systematic Review

Background: Routine childhood immunization is one of the most critical global health interventions employed in the prevention of under-5 mortality around the world. African populations are disproportionately affected by high under-five mortality rates and account for 40% of the world's child death rate. Research has identified that less than 60% of children complete vaccination regimens. Identified causal factors include inequalities in the availability of vaccines and vaccine hesitancy in African communities.

Objective: This study systematically investigated, reviewed, and identified current literature to provide insight into the factors that facilitates vaccine hesitancy and the rationale guiding such beliefs.

Methods: The PRISMA guideline for the systematic review study protocol was employed in this review. Relevant literature published between 2005 to 2023, carried out in Africa centered around measured reports of vaccine hesitancy by community stakeholders were included in this review analysis.

Results: A total of 31 articles from Central, East, Western, and Southern Africa were included in this review. The approach to determining the phenomenon of vaccine hesitancy varied across the different publications and was dependent on the context of population design and the methodology employed to collect data. Findings implicate four main drivers of vaccine hesitancy including confidence, convenience, complacency, and contextual influences. Poor vaccination service, mistrust of vaccine programs, perceived low risk of infections and religious beliefs were strong contenders influencing caregivers' decisions.

Conclusion: Understanding community-level vaccine hesitancy drivers is necessary to improve vaccine uptake and self-efficacy of caregivers to complete vaccination schedules for their wards. Building vaccine delivery programs in the geographical context of the targeted population and vaccine education programs involving key community influencers is vital to changing the perception of vaccine safety.

Primary Presenter

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GWSPH RESEARCH SHOWCASE

GLOBAL HEALTH

The effect of vitamin D supplementation during pregnancy on maternal, neonatal, and infant health; a systematic review and meta-analysis

Background: Previous studies link vitamin D deficiency in pregnancy to adverse pregnancy outcomes like preeclampsia, gestational diabetes mellitus, hypertension, pregnancy loss, and preterm birth. This study updates the 2017 Roth et al meta-analysis of the same topic with additional trials since its publication to investigate the effects of vitamin D supplementation during pregnancy.

Methods: We searched MEDLINE, PubMed, EuropePMC, Scopus, Cochrane, Web of Science, and CINAHL for randomized controlled trials supplementing pregnant women with vitamin D. Interventions included vitamin D or vitamin D plus calcium and other vitamins. Comparators were placebo, no intervention, or active control (≤ 600 IU/day). We categorized outcomes of interest into maternal, neonatal, and infant. We used the DerSimonian and Laird random effects model to pool data by presenting risk ratios for dichotomous outcomes and mean difference for continuous outcomes.

Results: We included 62 trials with 15,368 participants randomized in this meta-analysis. Of these, 36 trials (58%) used placebo control trials while 26 trials gave participants an active control. Vitamin D supplementation showed no impact on risk of preeclampsia (6 trials; 1483 participants; RR 0.81 95% CI 0.43, 1.53) and a protective effect on gestational diabetes (10 trials; 1878 participants; RR 0.65 95% CI 0.49, 0.88), and stillbirth (19 trials; 8968 participants; RR 0.80, 0.61, 1.04) Antenatal vitamin D supplementation increased the birth body weight of infants by 50.8 gram (29 trials, 8243 participants; 95% CI 13.00, 88.50).

Conclusion: Despite our findings about potential protective effect of supplementation on gestational diabetes, the benefits of vitamin D supplementation in pregnancy remain uncertain. Low quality of the data is a limitation of our study. We suggest that clinical practitioners cautiously supplement pregnant women with vitamin D.

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Health Policy and Management

GWSPH RESEARCH SHOWCASE

HEALTH POLICY AND MANAGEMENT

Rethinking Traditional Emergency Department Care Models in a Post-Coronavirus Disease-2019 World

As the nursing shortage in United States emergency departments has drastically worsened since the coronavirus disease-2019 (COVID-19) pandemic, emergency departments have experienced increased rates of inpatient onboarding, higher rates of patients leaving without being seen, and declining patient satisfaction scores. This paper reviews the impacts of the coronavirus disease-2019 pandemic on the current nursing shortage and considers how various medical personnel (emergency nurse-extenders) can ameliorate operational challenges by redesigning emergency department systems. During the height of the coronavirus disease-2019 pandemic, the psychological effects of increased demand for emergency nurses coupled with the fear of coronavirus infection exacerbated nursing turnover rates. Health care workers who can be trained to augment the existing emergency department workforce include paramedics, Emergency Medical Technicians, emergency department technicians, ancillary staff, scribes, and motivated health sciences students. Utilizing non-nurse providers to fulfill tasks traditionally assigned to emergency nurses can improve emergency department flow and care delivery in a post-coronavirus disease-2019 world.

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GWSPH RESEARCH SHOWCASE

HEALTH POLICY AND MANAGEMENT

The Impact of Perceived Ethnic Discrimination and Acculturation on Mental Health Among Young Racial Minority Adults in Washington, DC

Background: Racial minorities face an increased risk of experiencing negative mental health outcomes due to acculturative stress and perceived discrimination. An individual's perception of discrimination and their ability to adapt to the dominant culture can significantly impact their self-esteem. Previous studies examining the link between perceived discrimination and acculturative stress have rarely explored the potential effects on anxiety and self-esteem. This research aims to shed light on the underlying mechanisms that contribute to psychological distress among young racial minority adults.

Methods: A snowball sample of 55 total students from 3 universities in the DC area (Georgetown, George Washington, and Howard) was achieved via an online survey. The age range of survey participants was 18-24 years (m = 22.3). All participants had Asian, Black, and Hispanic backgrounds.

The Perceived Ethnic Discrimination Questionnaire was utilized to capture the levels of perceived racism and discrimination experienced by a participant throughout their lifetime on a 5-point Likert scale. The Rosenberg Self-Esteem Scale was used to assess self-esteem of the participant on a 4-point scale. The Beck Anxiety Inventory assessed anxiety levels for each participant, based on symptomology in the past week on a 4-point scale. Finally, the Social, Attitudinal, Familial, and Environmental Acculturation Stress Scale was used to assess acculturative stress levels in each participant on a 5-point Likert scale.

Results: There was a positive correlation between perceived discrimination and self-esteem ($r(50) = 0.26$, $p < .05$). There was also a significantly positive correlation between discrimination and anxiety ($r(50) = 0.38$, $p < .01$). Finally, a positive correlation was observed between acculturative stress and self-esteem ($r(50) = 0.36$, $p < 0.01$) and varied between racial groups.

Conclusion: This study's results align with prior research that has shown a positive correlation between heightened levels of perceived discrimination and lower self-esteem, as well as increased anxiety. Acculturative stress has been previously linked to higher levels of anxiety and lower self-esteem in minority individuals, according to research. These findings were corroborated by the current study. Previous studies have seldom compared levels of perceived discrimination and acculturative stress across different racial groups. However, the current study found a marginally significant difference between groups in terms of perceived discrimination, which contrasts slightly with prior research.

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Prevention and Community Health

GWSPH RESEARCH SHOWCASE

PREVENTION AND COMMUNITY HEALTH

Smoking prevalence among patients living with HIV and HIV-care providers knowledge, attitudes, and perceptions of smoking and smoking cessation in Western Jamaica

Background: Tobacco consumption increases the risk of developing chronic health conditions, particularly among PLWH. However, tobacco use is a modifiable risk factor and cessation can decrease mortality rates. There are limited data on smoking prevalence among PLWH in Jamaica despite the prevalence of tobacco use among the general population being 15%.

Methods: A cross-sectional study was conducted among PLWH ≥ 18 years attending HIV treatment clinics and completed an interviewer-administered questionnaire. HIV-care providers were asked to complete another survey addressing the KAP of smoking and smoking cessation. Results: Smoking prevalence among study participants was 17.4%; 36.7% were moderate to highly dependent on nicotine. About 20.0% of study participants had never been asked about their smoking status by their healthcare providers, but 94.8% reported high to moderate motivation to quit smoking. Current smoking among participants was significantly associated with being male (OR = 3.02; 95% CI: 1.64 - 5.57; p<0.001), non-Christian (OR = 2.14; CI: 1.18 - 3.88; p=0.012), moderate to severe depression (OR = 3.60; CI: 1.19 - 10.88; p=0.023) and having clinically significant alcohol abuse (OR = 3.35; CI: 1.05 - 10.68; p=0.022).

Conclusion: Our findings provide baseline information for designing and implementing a comprehensive smoking cessation program that considers the needs of PLWH in Jamaica, with the potential of becoming a replicable model for other HIV-specialized healthcare settings in the Caribbean.

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GWSPH RESEARCH SHOWCASE

PREVENTION AND COMMUNITY HEALTH

"As A Woman, I Look Very Pretty But Out Of Respect For My Family I Didn't Dress At Home": Social Support And Health Among Latina Immigrant Transgender Women In The DMV Area

Background: The present study aims to understand ways in which Latina immigrant transgender women (LITW) in the Washington, DC metropolitan area navigate different types of social support, and how this support is associated with their health. The findings will advance healthcare professionals' understanding of Latina immigrant transgender women and ultimately improve care provisions.

Methods: Data comes from the baseline phase of a larger longitudinal exploratory mixed methods study with 50 Spanish-speaking LITW living in the Washington, DC metropolitan area. Data collection and analysis occurred in Spanish. We used thematic analysis to identify topic codes related to social support, discrimination and violence from family members, migration to the U.S, and mental and physical health.

Results: The participants' responses yielded that, although they felt social support from family, partners, the trans community, and others, most lack of support came from family and the transgender community. Lack of social support has negative influence on LITW health. Social support helps legitimize LITW worries and feelings while under stress, reduce anxiety levels and depression. Anxiety and stress levels are the result of not being accepted by their family, worrying about family's financial security, immigration status, and ability to receive healthcare services. Furthermore, LITW highlighted the importance of vocational education and training to continue their education to obtain job opportunities. Similarly, LITW expressed the need for competent healthcare professionals that understand their health needs.

Conclusions: This research shows that social support and lack of social support affects LITW health. Social support can help LITW by providing acceptance, guidance and necessary resources. Given that the Latina transgender community faces unique challenges like discrimination, racism, and hate crimes, social support needs to be studied and quantified in this community. Research can emphasize the unique needs of this group by recognizing their identities as Latinas and transgender women.

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GWSPH RESEARCH SHOWCASE

MATERNAL AND CHILD HEALTH

Safety of Newborns' Soft Palate Manipulation As A Saudi Traditional Medicine To Treat Infant Colic and Poor Feeding

Background: Infant colic can be anxiety-provoking for many families. Even if a child does not suffer from infant colic, a mother might struggle with feeding her. For such challenges, young and experienced mothers might seek complementary medicine. In Saudi Arabia, infant colic and poor feeding have been treated by traditional healers for decades. Saudi traditional healers use a maneuver called "Autheem- عظيم". This maneuver is based on a common belief among Saudi public of urgent needs to manipulate soft palates for struggling infants.

Methods: This study is adopting a cross-sectional methodology to capture children at age of 36 months who underwent "Autheem" therapy. The study is meeting mothers in waiting areas for general pediatric clinics in Riyadh, Saudi Arabia. After surveying mothers regarding attitude and safety, mothers have been answering "Ages and Stages Questionnaire" to assess their children's development.

Results: The ongoing study attracted well educated mothers (30% high school graduates and 70% with college degrees). Most mothers are aware of this traditional practice before their pregnancy. Their main sources of information are their own mothers and family elders. Beside infant colic and poor feeding, responding to grandmothers' pressure was another major reason to seek this therapy. Almost all mothers admitted if they found a solution in modern medicine, they would not have explored this therapy. Despite positive attitude toward this therapy among participants, only 60% would recommend it as a therapy of infant colic. Regarding safety, mothers noted that most healers do not wash their hands or wear gloves. However, there was no acute association of this therapy to infections or emergency visits. The only noted acute side effects are lethargy (60%) and poor feeding (20%). During visits with traditional healers, healers made no comment about vaccination but offered cautery therapy to 40% of patients. Autheem therapy is associated with delay in gross motor (40%), fine motor (30%), problem solving (30%) and personal & social skills (20%). There has been no link between this therapy and delay in communication yet.

Conclusion: To our knowledge, this is the first study to investigate safety of "Autheem" therapy and its impact on young infants' development. Lethargy and poor feedings immediately post "Autheem" therapy are alarming. Association with developmental delays might indicate long term impact of this therapy on growing brains. More research is needed to establish causality.

.

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GWSPH RESEARCH SHOWCASE

MATERNAL AND CHILD HEALTH

Telemedicine and Pediatric Care in Rural and Remote Areas of Low-Income Countries: Systematic Review

Background: Caring for children in rural and remote areas can be challenging. The challenges double in low-income countries with lower resources and high poverty rates. For this reason, many low-income countries can find Telemedicine as an appealing and affordable tool to improve access and quality of pediatric care.

Methods: A search of four databases (PubMed, EMBASE, Cochrane, GOOGLE Scholar) was conducted using 20 key words in English. After title and abstract screening, duplicates were removed. Later, a full text review yielded 60 studies that were included in this review.

Results: Beside medical education and direct pediatric care, Telemedicine can provide sub-specialties consultations without extra burden on families. Additionally, Telemedicine can help in lowering under-5 mortality by supporting neonatal care, infectious illnesses, and non-communicable diseases (NCDs). It has been expanded to deliver radiology assessment, capacity building and task shifting. Currently, different types of Telemedicine can be suitable for different settings of pediatric care. Asynchronized (save and forward) Telemedicine can fit well in a busy primary and non-urgent care clinic while synchronized (real-time) Telemedicine is designed to support emergency and critical care settings. Telemedicine can be a gate for universal coverage for all children at a lower cost. For over a decade, it has been implemented successfully and sustained in a few low-and-middle- income countries. However, challenges in implementing Telemedicine in low-income countries are enormous. Still, opportunities arise by using simpler technology, low-width band internet, smartphones, instant messaging applications and solar energy. COVID-19 pandemic facilitated acceptance and applicability of Telemedicine worldwide. Furthermore, the pandemic allowed the market of Telemedicine to grow attracting many entrepreneurs and startups who can advance innovations and drive Telemedicine further. Nevertheless, governments must regulate Telemedicine by issuing policies and ensuring employment of local experts, when possible, to meet local resources and cultural competency.

Conclusion: Telemedicine has potential to advance pediatric care in rural and remote areas of many low-income countries. It might be a gate for a universal health coverage and lowering under-5 mortality. Furthermore, it can help in advancing pediatric care through direct clinical support and pediatrics' education. Evidently, low-income countries should take advantage of this innovation to improve pediatric care and promote equity within their countries.

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GWSPH RESEARCH SHOWCASE

PREVENTION AND COMMUNITY HEALTH

How attributes of place threaten community trust in the American South: Opportunities for improving pandemic-related communication

Background and Significance: Trust and mistrust influence the utilization of health services, the quality of overall healthcare, and the prevalence of health disparities. Trust has significant bearing on how communities, and the individuals within them, perceive health information and recommendations.

Methods: The People and Places framework is utilized to answer what attributes of place threaten community trust in public health and medical recommendations. Augusta-Richmond County is ranked among the least healthy counties in Georgia despite being home to the best healthcare to resident ratios and a vast array of health care services. Semi-structured interviews were conducted with 31 neighborhood residents. Data were analyzed using the Sort & Sift, Think & Shift method.

Findings & Conclusions: Threats to community trust were identified within four local-level attributes of place: availability of products and services, social structures, physical structures, and cultural and media messages. We found a broader web of services, policies, and institutions, beyond interactions with healthcare, that influence the trust placed in health officials and institutions. Participants spoke to both a potential lack of trust (e.g., needs not being met, as through lack of access to services) and mistrust (e.g., negative motives, such as profit seeking or experimentation). Across the four attributes of place, residents expressed opportunities to build trust.

Implications: Our findings highlight the importance of examining trust at the community level, providing insight into an array of factors that impact trust at a local level, and extend the work on trust and its related constructs (e.g., mistrust). As public health professionals, we cannot ignore communities' lived experiences, or idly watch as harmful policies are created (within or outside health care), and expect communities to trust communication during a public health emergency. Long-term investment includes building relationships and demonstrating to communities that the healthcare institutions and their agents are invested in their well-bring from the beginning, not just when things are dire. When a future crisis emerges, these existing relationships will enable community members to seek information and provide community insight while simultaneously enabling communication and public health professionals to disseminate information.

Primary Presenter

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GWSPH RESEARCH SHOWCASE

PREVENTION AND COMMUNITY HEALTH (PHCM)

Acceptability of Facebook Groups for COVID-19 Vaccine Hesitant Individuals: Role of Group Moderators

Introduction. Social media platforms represent a useful tool to promote health behavior change. The aim of this study is to assess participant ratings of moderators in a COVID-19 vaccine promotion Facebook group.

Methods. Participants were randomly assigned to control and intervention groups to participate in a moderator-based social media intervention about vaccines. Intervention participants (N = 216) completed a survey following week 4 of the intervention and responded with closed and open-text responses assessing moderator roles (e.g., what they liked and disliked about moderators). Participants were asked to rate moderator qualities on a scale of 1 (e.g., unsympathetic) to 7 (e.g., sympathetic). The open-text responses were dual coded and themes were identified.

Results. On average, participants were 37.0 years old (SD = 10.3), 70.9% female, and 78.6% White. Participants generally agreed that moderators provided clear answers to their questions (4.79/7). Moderators were rated highly for the following qualities: 1) tolerance (5.48/7); 2) sincerity (5.40/7); and 3) support (5.33/7). Other moderator qualities were also rated in a moderate-to-high range, including: warmth (5.26/7), compassion (5.24/7), sympathy (5.23/7), heartfulness (5.11/7), and sensitivity (5.09/7). Open-text responses revealed that participants liked the moderators for being responsive (18.9%), friendly (16.7%), and professional (16.7%). The most common response for *moderator dislikes* was “nothing”, indicating that participants were generally satisfied with moderators. Less frequently reported, participants indicated that they disliked moderators for being biased (14.3%), inactive (5.24%), and unresponsive (3.33%).

Conclusions. Overall, participants generally liked moderators. Favorable qualities of the moderators included the extent to which they were responsive and interactive, however, there are ways to improve. Results can inform future moderator-based social media interventions.

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GWSPH RESEARCH SHOWCASE

PREVENTION AND COMMUNITY HEALTH

Understanding End of Life Decision Making in Teens with Cancer

Background and Significance of the Study Cancer is the leading disease-related death for adolescents. Over 11,000 adolescents and young adults (AYA) die from cancer and other serious illnesses each year. About 86% of AYAs want to participate in discussions related to EOL care.

Purpose The culminating experience project is titled "Understanding End of Life Decision Making in Teens with Cancer" and presents the important public health topic of adolescent cancer that could lead to possible tragically young deaths. The purpose of this project is to examine patient-reported end-of-life values and needs of adolescents with cancer for ages 14-17 and ages 18+ in terms of differences in survey responses.

Methods The advanced care planning cross-sectional survey was conducted between July 2016-April 2019 and included adolescents with cancer and their families recruited from 4 tertiary care pediatric hospitals. Analyzing specific survey items related to end-of-life decision making, knowledge, and important factors in death and dying between the younger adolescent group and older group, will help inform researchers, providers, care teams, families, and adolescent patients on how to best support patients and families when faced with the difficult situation of end-of-life care and possible death of cancer.

Results The five survey response items and the importance of death and dying related survey items of the FACE-TC survey overall showed no significant differences between the age groups 14-17 and 18+ and the majorities of both groups had similar indications in their response options.

Conclusions There is no present clear evidence that there is a major difference between adult and adolescent/children's judgement and decision making as well as adolescents between ages 14-17 and ages 18+. End-of-life decision-making and care needs to be implemented, researched, and practiced in order to ensure the health, well-being, and peace of adolescent cancer patients and their families.

Implications of Findings Researchers and public health practitioners must take a part racial disparity in terms of death and EOL care. There is a lack of research and emphasis on SDoH considerations for this public health issue. Needs assessments and evaluations should be conducted by public health practitioners and psychologist researchers. Continuing to implement interventions and conduct research with adolescents in their key developmental periods is essential to ensuring adolescents have a voice and autonomy in EOL decision making and care.

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PREVENTION AND COMMUNITY HEALTH

National Institute on Aging (NIA) Outreach Pro Creative Concept Testing Focus Groups

To increase recruitment of underrepresented populations to Alzheimer's disease and related dementias (AD/ADRD) clinical trials, Fors Marsh and Marketing for Change conducted eight focus groups (N = 46) on behalf of NIA in March 2023. Focus groups were segmented by an individual's status as at-risk of or a caregiver for individuals with AD/ADRD and by race/ethnicity, including Black/African American, Hispanic/Latino, and mixed persons of color. During each group, participants discussed their knowledge and awareness of clinical trials and AD/ADRD, before seeing segment-specific creative concepts. Using a stepwise approach, participants provided in-depth feedback on individual images and copy for materials development before providing feedback on the draft concept as a whole. Through the creative testing process, participants shared reactions that reflected the representation of their families and communities in imagery, as well as hesitations with language that evoked historical mistrust in research participation. The feedback received will help refine creative concepts into attention-grabbing, relevant, and culturally competent creative materials that reduce distrust and encourage participation in AD/ADRD clinical trials.

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GWSPH RESEARCH SHOWCASE

PREVENTION AND COMMUNITY HEALTH

Awareness of E-Cigarette Health Warning Labels and Harm Perceptions in US

Significance:

In 2018, the US FDA mandated that a nicotine addiction warning label appear on e-cigarette packaging and advertisements. This study aimed to 1) describe awareness of e-cigarette warning labels and correlates among US adults, and 2) examine the association between awareness of warning labels and perceived harm of e-cigarettes.

Methods:

We conducted weighted cross-sectional analyses of Wave 5 (Dec 2018 – Nov 2019) of the Population Assessment of Tobacco and Health study. The analytic sample (N=5,703) was representative of US adults (aged 18 and older) who reported past 30-day e-cigarette use. We descriptively examined sociodemographics, general harm perceptions, and awareness of noticing e-cigarette warning labels (1=never to 5=very often). Weighted linear regression was conducted to identify correlates of awareness and whether awareness is associated with the perceived harm of e-cigarettes (1=not at all harmful to 5=extremely harmful).

Results:

Overall, 50.3%, 32.8%, and 16.9% of past 30-day e-cigarette users reported never, rarely/sometimes, and often/very often for noticing e-cigarette warning labels, respectively. Users rated general harm perceptions: nicotine to health (M=3.62, SD=1.11), using e-cigarettes (M=3.18; SD=1.08), menthol e-cigarettes (M=2.05, SD=0.42), and nicotine in e-cigarettes (M=3.15, SD=1.08); 63.2% of participants had inaccurate perceptions of the relative harm of e-cigarettes compared to cigarettes (i.e., rated cigarettes as equally or more harmful). Linear regression results indicated that being older ($p<.001$) and female ($\beta=-0.13$, $p=.008$) were associated with less awareness of e-cigarette warning labels, whereas being never married ($\beta=0.17$, $p=.026$), no past 30-day cigarette use ($\beta=0.20$, $p<.001$), and increased frequency of e-cigarette use ($\beta=0.02$, $p<.001$) were associated with greater awareness. Regarding perceived harm of using e-cigarettes, noticing e-cigarette warning labels often/very often (compared to never) ($\beta=0.22$, $p=.003$) being female ($\beta=0.24$, $p<.001$), and Hispanic ($\beta=0.22$, $p<.001$) were associated with greater perceived harm. More frequent e-cigarette use ($\beta=-0.02$, p=001) was associated with decreased perceived harm.

Conclusions:

Noticing e-cigarette warning labels was associated with age, sex, marital status, past 30-day cigarette use and frequency of e-cigarette use. Noticing labels more often was associated with greater perceived harm. Further research is warranted to understand these associations across segments of e-cigarette users such as exclusive, dual, and former users and the specific mechanisms by which warning labels influence e-cigarette use intentions.

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Doctor of Public Health

GWSPH RESEARCH SHOWCASE

DOCTOR OF PUBLIC HEALTH (DRPH) PROGRAM

Examining influencer compliance with advertising regulations in branded vaping content on Instagram

Background: More than 50% of US youth report past 30-day exposure to vaping ads on social media. This exposure is associated with an increased risk of initiation and habitual use of vaping products. Instagram, in particular, is a platform where young people are exposed to a high level of pro-vaping content even though existing guidelines from the FDA, FTC, and Instagram's policy against promoting tobacco use should limit the prevalence of vaping content. Identifying posts subjected to such guidelines is challenging, especially from seemingly organic users (influencers). Using replicable criteria to identify vaping ads posted by Instagram influencers, this research documents the extent to which such posts follow existing content regulations.

Methods: We identified Instagram vaping influencers using a definition of an influencer as "third-party actors who have established a significant number of relevant relationships... to influence organizational stakeholders through content production." In October 2021, we identified 54 unique influencers with 100,000 followers or more. For each influencer, we downloaded up to 10 of their most recent posts, yielding a sample of N=262 vape-related posts. Each post and the 54 influencers Instagram home pages were content coded to identify compliance with existing regulations. A codebook of discrete features was validated by two coders on a sample of n=66 posts to obtain the reliability of Krippendorff's alpha > .8.

Results: The influencer accounts were comprised of individuals n=28 (51.8%), brands n=15 (27.8%), and other commercial entities such as retailers or shops n=17 (31.5%). A third of influencer bios included links to vaping stores n=17 (31.5%). Nearly all posts featured vaping products, n=239 (91.2%). Despite 186 seats (76.2%) explicitly promoting a brand, only one post complied with FTC requirements of disclosing brand relationships. Only 50 posts (20.9%) had warning labels, with only 8 (15.1%) fully compliant with FDA rules. Finally, three posts used cartoon imagery, violating the FDA's warning about use of youth appealing advertisements.

Discussion: Findings indicate that compliance with established regulations is negligible. Instagram's claim in 2019 that they would no longer permit the promotion of vaping products is not enforced. Moreover, violations of minimal FDA and FTC guidelines for social media promotion must also be enforced more among a highly visible population of vaping influencers.

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GWSPH RESEARCH SHOWCASE

DOCTOR OF PUBLIC HEALTH (DRPH) PROGRAM

Analysis of e-cigarette warning letters from the Food and Drug Administration in 2020 and 2021

Introduction: On May 10, 2016, the USFDA finalized its "deeming" rule, asserting its authority to regulate e-cigarettes, cigars, and vape pens. The rule authorized the FDA to take enforcement action against companies selling products without filing a premarket tobacco application (PMTA). In 2017, the FDA began issuing warning letters to e-cigarette companies for violations, including failure to file a PMTA, advertising to youth, selling to minors, and packaging violations or mislabeling. This study analyzes FDA warning letters sent to e-cigarette companies from January 1 2020-September 9, 2021. Study results can inform the regulation of e-cigarettes.

Methods: Warning letters retrieved from the FDA's website were coded for: company type (retailer, manufacturer, or distributor), location (domestic or international), infractions listed (PMTA, selling to minors, advertising to youth, or packaging violation/mislabeling), product type (e-liquid, device, or both), flavor (fruit, candy, tobacco, menthol/mint, concept flavor), and consequence (civil money penalties, product seizure and injunction, product detention and refusal of US entry, no-tobacco-sales order, criminal prosecution).

Results: Of 303 coded letters (126 from 2020 and 177 from 2021), 97.4% were sent to small online retailers. Overall, 94.1% of the companies cited were located within the US, 75.2% of the infractions were identified by reviewing a company's website, and 70.5% were PMTA violations. In 2020, 55.6% of offenses were PMTA violations; in 2021, nearly all were PMTA violations. The letters cited 880 products, 92.2% of which were e-liquid, with 32.4% fruit and 31.1% concept flavors.

Discussion: The FDA's 303 warning letters sent in 2020 and 2021 targeted small online retailers (i.e., limited liability companies) that were identified almost exclusively through website searches. These warnings focused predominantly on e-liquid products rather than the big tobacco-affiliated brands or the e-cigarette products most used by youth and young adults, such as podmods and disposables. The seriousness of the infractions and the significant presence of youth-appealing flavors indicate an e-cigarette environment targeted toward youth use. The actions FDA took with these letters were necessary. However, the strategy employed by the FDA in 2020 to identify infractions focusing on small online vape shops has limited implications for how they will address violators moving forward. As PMTA decisions on the products that remain on the market are made – decisions that will address products that comprise the majority of the e-cigarette market and products that are preferred by youth and young adults – the FDA will need to exercise its full regulatory authority in enforcing compliance in the marketplace.

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GWSPH RESEARCH SHOWCASE

DOCTOR OF PUBLIC HEALTH PROGRAM

The Well-being of Women in Healthcare Professions: A Comprehensive Review

Background: A multidisciplinary team of health scientists and educators at an academic medical center came together to consider the various factors that impact well-being among self-identified women working in healthcare and conducted a comprehensive literature review to identify the existing body of knowledge.

Objectives: To examine how well-being is defined, what instruments are used to measure it, and correlation between professional and personal gender-specific factors that impact the well-being of women in healthcare occupations.

Methods: A total of 71 studies published in 26 countries between 1979-2022 were extracted from PubMed. Studies enrolled adult women (18-74 y.o.) healthcare professionals including nurses, physicians, clinical social workers, and mental health providers. Well-being related phenomena such as quality of life (QOL), stress, burnout, resiliency, and wellness were investigated. In this review, women are broadly defined to include any individual who primarily identifies as a woman regardless of their sex assigned at birth.

Results: The results of our analysis were consistent across the scope of the literature and indicated that women in healthcare occupations endure a significantly higher level of stress and burnout compared to their male counterparts. The following gender-specific factors were identified as having direct correlation to well-being: job satisfaction, psychological health, and work-life integration.

Conclusions: The findings from this review indicate a need for evidence-based integrative interventions across healthcare enterprises to combat stress and burnout and strengthen the resiliency and well-being of women in healthcare. Using information from this review, our team will launch a comprehensive well-being assessment and a series of interventions to support resiliency and well-being at our academic medical center.

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Addressing the Mobilization of Complementary and Integrative and Allied Health Professionals in Public Health Emergencies

Background and Significance of Study: The COVID-19 pandemic has necessitated an unprecedented call to action for quick response to mitigating the impacts of the virus. In times of public health emergencies, the population's health could be best served with a larger workforce capacity. However, it appears that complementary and integrative health (CIH) and allied health professionals had limited participation in the public health response to COVID-19 due to barriers such as absence of opportunities.

Purpose of Research: The purpose of this study was to investigate how CIH and allied health professionals have successfully mobilized in the past and to provide recommendations for their future possible support/participation in public health emergencies.

Methods: A literature review and mixed methods qualitative research interviews of professional organizations were utilized to understand past mobilizations and lessons learned.

Results and Conclusions: The results of the literature review revealed a scarcity of publications regarding CIH and allied health professions past mobilizations for response to public health emergencies. The qualitative interview results discovered core concepts of collaboration, communication, workforce capacity, learning, leadership, and ethics/values as essential for successful mobilization and response to public health emergencies.

Implications of Findings: Recommendations for improving public health emergency response by CIH and allied health professions include streamlined and collaborative communication channels, building a culture of interest in public health through academic institutions and research, advanced registration and vetting for local public health volunteer opportunities, and post-graduate training in public health emergency response.

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How an Antiracist Demonstration Project Can Inform a Program Training

Background: After the murder of George Floyd, institutions across the nation reckoned with their own legacies of racism and harm. In particular, an urban academic medical center stated its goal of becoming an antiracist medical enterprise. It is incumbent that institutions with antiracist aim fully engage all its members to reduce the "minority tax" that traditionally exists for people of color when leading such efforts.

Methods: We designed a participatory action research case study to collect pilot data from two rehabilitation sciences programs (a new one and an existing one) to test an antiracist organizational change model (Ward, et al., 2022). In Fall 2022, we administered a 31-item climate survey (n=63) to assess awareness of racism, perceived institutional capacity, and readiness for antiracism. Of these survey respondents, we conducted follow-up interviews (n=6) in Spring 2023.

Results: Data from the climate survey found that 100% of the new members actively educate themselves on racism while only 20% do the same in the existing program. We also found that only 70% of existing members believe that the U.S. government has not adequately acknowledged the impact of slavery compared to 100% of new members. Qualitative findings demonstrate that 100% of the new members define racism as systemic whereas existing members narrow in on it interpersonally.

Conclusions: The data suggest that the new and existing programs are operating on different baseline understandings of racism and the impact of slavery within medicine, illuminating the need to design tailored training programs.

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D.I.S.R.U.P.T. Antiracism Training in Antiracist-Pledged Academic Institutions

Background: Faculty, staff, and trainees in academic institutions, especially those involved in healthcare, may experience racism – as a target, bystander, or as an aggressor, even if unintentionally. Institutions across the country have pledged to become antiracist institutions, requiring those within these academic institutions to encourage and embrace antiracism training, as well as increase participants' ability to think and act systematically.

Significance: It is essential that academic institutions with antiracist aims provide and encourage all its members – especially those involved in healthcare – to participate in antiracism training to promote sustainable culture change and institutional antiracism.

Methods: We designed a two-part educational intervention in which we present the D.I.S.R.U.P.T. antiracism model in an asynchronous self-paced online course and live applied follow-up training workshop to show participants how to change institutional culture and personal values that maintain racism. In our 2021-2023 groups, we administered retrospective pre/post-tests (n=300) to assess the participants' change in knowledge, skills, and attitudes. Of these survey respondents, we conducted follow-up surveys (n=144) after the training took place to assess participants' ability and comfortability to use the D.I.S.R.U.P.T. model in the workplace after completing the training.

Results: Data collected from the surveys found that throughout the training process, 81.2% of all participants agreed or strongly agreed that they had adequate time to practice the D.I.S.R.U.P.T. model in a common scenario. We also found that 77.8% of all participants felt comfortable applying this model to other workplace scenarios, while 18.8% felt neutral about this claim.

Conclusion: These results suggest that the vast majority of those involved in the D.I.S.R.U.P.T. Antiracism Training have successfully learned to recognize interpersonal and structural forms of racism that occur in the workplace, as well as how to address them. This further proves the need for antiracism curricula in academic institutions that pledge to be antiracist.

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Understanding the COVID-19 Pandemic Impacts on Women in Alaska through the Prism of a Wellness Concept

The Arctic has historically been vulnerable when met with emergency situations, and the COVID-19 pandemic is no exception. The region's geographic remoteness and limited access to resources elevate the importance of nuanced subnational and local regulations. In focusing on Alaska's gender-sensitive policy responses to the pandemic, this paper will examine the effectiveness of Alaska's legislation using the gendered lens, focusing on one of its most at-risk demographics: women. Under the pandemic, women are disproportionately affected in terms of unemployment, domestic violence, and increased burden of responsibilities, including child/elderly care and household tasks. In addition, women working in female-dominated spheres such as healthcare are subject to higher rates of COVID-19 contraction. In this context, the growing volume of literature demonstrates that a public health approach extending beyond physical healthcare is essential amid and beyond the pandemic.

Mainstreaming wellness as an integral part of government responses can be considered a good practice. Notably, this holistic approach has some similarities to the ideas of health and wellness among Alaskan Indigenous Peoples. The wellness model developed by the U.S. Substance Abuse and Mental Health Services Administration (SAMHSA) consists of eight equally valued components—social, occupational, intellectual, emotional, physical, environmental, financial, and spiritual. Although this model was designed to encourage recovery amongst individuals dealing with substance use, it highlights the importance of a holistic approach to crisis response. The paper will therefore evaluate Alaska's gendered policy response to the COVID-19 pandemic through the prism of a wellness concept to better understand lapses in gender-responsive crisis-time decision-making in addressing SAMHSA’s eight dimensions of wellness.

With the analysis of Alaska's policy compendiums, this paper's classification of policies in terms of their responsiveness to women's needs in the prism of the wellness concept will inform a holistic understanding of decision-making trends and policy-relevant highlights for Arctic regions' solutions to crises.

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Dual Pandemics: Impacting Policy Change for COVID-19 Vaccine, HIV, and PrEP/PEP Screening.

Background: With a global focus on COVID, HIV prevention efforts are being deprioritized, harming BIPOC and LGBTQIA+ patient populations disproportionately impacted by both pandemics. Screening for COVID-19 vaccination status, HIV/AIDS, and pre-exposure prophylaxis (PrEP)/post-exposure prophylaxis (PEP) is critical to reduce the burden and impact of these two pandemics. The Two in One Model is a national educational intervention with the goal of improving the capacity of primary care practitioners (PCPs) to make routine culturally responsive and nonjudgmental communication about COVID vaccine and HIV and PrEP/PEP screening and testing with their racial, ethnic, sexual, and gender minoritized patients. This initiative has been divided into three separate components: research, training, and policy. The goal of the policy work is to change the clinical guidance for HIV screening and offer implementation guidelines for all three screenings to be the standard of care in the primary care setting.

Methods: Current CDC guidelines were identified and the definition of screening was clarified. Furthermore, current PCP-driven HIV and PrEP/PEP screening and testing practices, and COVID-19 vaccine recommendations were reviewed.

Results: White papers were created to identify current issues with HIV, PrEP/PEP, and COVID vaccine screenings and the gaps in clinical guidelines, situated in qualitative data collection and analysis as well as ongoing scoping reviews, and suggest policy recommendations for each identified issue. Key stakeholders in education, clinician development, and health advocacy work were selected to be “Advocacy in Action” partners, each with personalized calls to action.

Conclusion: This national policy engagement strategy serves as guidance for how future clinical researchers can interpret and translate data from published literature, scoping reviews, and existing CDC guidelines into new clinical policy recommendations.

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GWSPH RESEARCH SHOWCASE

PUBLIC HEALTH, INDUSTRIAL-ORGANIZATIONAL PSYCHOLOGY

The Impact of Workplace Age Discrimination: A Comparison between Chinese and American Employees

Building upon the conservation of resources theory (Hobfoll, 2001) and the cross-cultural literature, the present study examined the effects of workplace age discrimination on employee career satisfaction and affective commitment across Chinese and American employees. China and America, which are representative of a Far Eastern culture and a Western culture respectively, differ from each other in cultural dimensions of individualism and power distance (Hofstede et al., 2010). As such, when experiencing age discrimination at work, Chinese employees may be very reactive to such unexpected discrimination, and thus their career satisfaction and affective commitment may be lowered to a greater extent.

To test our hypotheses, we conducted a quantitative survey in a group of Chinese (N=463) and American (N=521) employees. Age discrimination, career satisfaction, and affective commitment were measured using a 6-item scale developed by Furunes and Mykletun (2010), a 5-item scale by Spurk et al. (2015), and a 3-item scale by Meyer and Allen (1997), respectively. Participants completed surveys in their native languages, English and Chinese, with the Chinese surveys translated using the standard translation and back translation procedure (Brislin, 1985). Results of multiple regression analyses found that the country-by-age discrimination interaction effects were significant for both career satisfaction and affective commitment. Specifically, the negative relationships of age discrimination with employee career satisfaction and affective commitment were stronger (vs. weaker) for Chinese (vs. American) employees.

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Training Primary Care Physicians (PCPs) to Historicize and Contextualize HIV and COVID Disparities among Minoritized Communities

Background: PCPs are uniquely positioned within the field of medicine to address structural and systemic inequities that result in health disparities for historically marginalized communities. The Two in One program aims to train physicians to address HIV and COVID disparities among minoritized patients in a culturally responsive manner. The training series is specifically designed to support clinicians in routinizing HIV, PrEP, and COVID vaccine screenings for all patients in primary care visits.

This series comes in two parts: a monthly live webinar as well as an online, asynchronous, self-paced course. All of the training topics historicize and contextualize barriers to care disparities that racial, ethnic, sexual, and gender-minoritized patients face.

Methods: The training series primarily targets PCPs in training and pipeline students. However, the training also targets researchers, non-clinician faculty, and scholars who are interested in HIV and COVID policies that impact population health. Every month, live CME-bearing trainings and an asynchronous course are conducted with renowned speakers in the field. Data is collected by evaluating responses from a retrospective survey that assesses changes in knowledge, attitudes, and skills related to routinizing COVID and HIV screening as well as overall course satisfaction. The number of registrants, attendees, and CME credit claims are also counted.

Results: The intended course outcomes include increasing PCPs knowledge, confidence, skills, and commitment to culturally responsive communication on HIV/PrEP and COVID vaccines with racial, ethnic, sexual, and gender-minoritized patients.

Conclusion: Although analyzing the survey results is still underway, the overarching objective of the training series is to change the narrative physicians utilize to address HIV and COVID disparities among minoritized patient populations. Through training physicians to adopt a culturally responsive approach to care, PCPs will more likely be willing to make changes to practice guidelines and clinical operations to routinize HIV, PrEP, and COVID vaccine screening for all patients.

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Spatial Analysis Of Housing Problems And Asthma Control Among Children With Asthma In An Urban Environment

Background: Striking socioeconomic health disparities persist in pediatric asthma in urban settings. The D.C. Pediatric Asthma Registry shows the highest pediatric asthma-related ED visit rates occur in Southeast D.C. where poverty and unemployment rates are highest.

Objective: In Washington, D.C. 16% of Black children have asthma compared to 3.3% of non-Hispanic, White children. There is growing evidence that deprivation of basic needs is associated with these health disparities.

Methods: A social needs questionnaire was developed and distributed in IMPACT DC to assess 7 categories of deprivation: presence of household asthma triggers, asthma concerns at school, finding employment, applying for public benefits, food insecurity, housing assistance, and general assistance. During the clinic visit, participants >4 years old completed the Asthma Control Test (ACT). Data was collected at initial in-person encounters for 5 months (February - June 2022), analysis was limited to participants living in Washington, D.C. Participant addresses were geocoded onto a map of Neighborhood Clusters (46 total clusters) defined by the D.C. Government Office of Planning.

Results: Of the 188 participants, average age was 7.6 years, 83% were Black, and 38% had moderate-severe persistent asthma. The majority (54%) reported $\geq$1 measure of deprivation. Of those, 45% identified household triggers and 49% identified housing assistance. The housing assistance requests included finding housing (61%), paying utilities (51%), and foreclosure counseling (8%). ACT scores were on average 2.3 points lower among those who reported household asthma triggers compared to those who did not (p=0.02). Using heat maps for spatial analysis, we identified that participants reporting household triggers and requesting housing assistance were concentrated within 6 Neighborhood Clusters in Southeast D.C. (Figure 1). These findings have the potential to impact policy change to elevate housing standards in Washington, D.C. and close the gap in health disparities of pediatric asthma.

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